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HOUSING & PLANNING ABSTRACTS

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Dymaxion map on cover by Buckminster Fuller, Patent 2393676

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EDITORIAL

-:-:-:

Adaptation is the operative work for the articles abstracted in this issue of Ekistics.

In his leading article Dr. Doxiadis instances the value of hypothetical models, patterns or diagrams as a starting point for the policy making stage of planning. This approach has undoubted merit, provided it is employed as a means and not an end: that is to say provided it is honestly employed as a starting point and the facts of the actual situation are not twisted to support it. Some of its strengths and weaknesses are indirectly brought out in several of the articles included in this issue.

From the articles on "The Indonesian Town" and "Trade patterns in northern Laos," it is clear that in societies in a state of flux, the social situation is of prime importance. It is all too easy to ignore the facts of ethnic and social stratification in such societies and two points from Halpern's survey of Laos seem especially valuable:

a. That stratification may become localised by certain geographical features;

b. That patterns of trade (of goods and services) are greatly influenced by the status rankings of the groups as well as by the geographical features of the land.

Three very different examples of the stimulating effect of plans carried out in accordance with predetermined principles come from an article on the new town of Vällingby in Sweden; a description of the spectacular housing and planning efforts in Singapore to meet some of the most difficult urbanization and housing problems in human experience; and an account of the effect of India's first Five Year Plan upon her multitudinous villages. In this last instance it is perhaps fair to comment that studies like those carried out by Karsten in Indonesia in pre-independence days could be most useful to the Indian Village Level Workers were it practicable to undertake them. From Karsten's work a sound body of urban sociology has developed which the current up-surge of planning in Indonesia (under an autonomous regime) cannot afford to overlook.

An instance of adapting an accepted system of institutions to very different conditions occurs in a United Nations article on British non-self governing Territories. Other hopeful forms of adaptation are described in an article on the work of Doxiadis Associates and in an account of low cost housing in Libya by a Polish United Nations Expert. In both cases the foreign experts - Greek and Polish - have made sincere attempts to understand the customs, the way of life and the traditional habits of building of the countries - East Pakistan and Libya - and have proceeded to apply their own knowledge of western technology to the situation. In both cases the results look practical, economic and hopeful.

Another technical development which also brings western technology into relation with eastern economics describes a solar water-heating apparatus which seems to show promise of wide applicability.

One of the stimulating aspects of planning on the regional level is the multi-purpose river development, and further information from the report on the Lower Mekong remains encouraging and instructive. The question of capital sources for such developments--as well as for national and for community development--is an ever present problem which often asserts itself as central to a given situation. Especially interesting in this respect is the steady maturation of the United Nations Special Fund for development, which began formal operations early this year.

Ekistics is compiled by Yvette and Lawrence Mann under the direction of Prof. J. Tyrwhitt. Enquiries or comments should be addressed to 7 Sumner Road, Cambridge, Massachusetts, USA.

NOTE: The lettering at the top of each page refers to Doxiadis Associates system of classification. The figures below each title refer to the Universal Decimal Classification.

ARCHITECTURE, PLANNING & EKISTICS

C.A. Doxiadis

Abstract of the second part of the first lecture of a series given at the Massachusetts Institute of Technology, Spring, 1957.

1. (Last month) I ended by saying that unless we can incorporate the fourth dimension of time into a plan this cannot actually come to life. For instance community facilities must be incorporated into new housing areas from the beginning but it is absurd to suggest that all the essential services should be fully paid for by one generation. Also if we are planning for the future these services have to have elasticity built into them as we cannot forsee the changes needed within a generation or two ahead. If we cannot plan in this way, incorporating the element of time, national economic planning becomes meaningless; new socially displaced classes are created resulting in political problems and unrest. The erection of houses alone has no meaning for unless we enable a balanced society to arise, fully equipped with community facilities, it will not be a happy society which can continue to exist and develop.

2. One of our first duties is to place the settlements we are asked to design within the framework of a national development program. A preliminary study is the preparation of a curve which can relate the projected population growth by say 1964 to the potential program of building activity over the same period: the potential supply of new houses as well as repairs or alteration of existing ones. Once this had been worked out on a national basis it has to be split up area by area into programs for major geographic regions, metropolitan areas, market centers, small towns, villages, housing groups down to the individual urban and rural houses. We have to re-study the program for each region: such as parts of Iraq where we found that certain areas were losing their young male population in the decennial periods of 10 - 20 and 20 - 30. We found that, once we had found the human problems hidden behind these statistics, we were able to make a plan for the area which resulted in an increasingly stable and prosperous population.

3. We have also to examine such social aspects of an area as the literacy and illiteracy rates and regard these in relation to the long term program of national development, considering whether those areas which are first to be developed will act as magnets to the rest of the population and, if so, how this problem should be met.

4. Only after a good understanding has been reached of the economic and social problems of the country can we start to prepare its housing program. This must be designed in relation to the availability of building materials and skilled labor. In the rural areas of most non-western countries houses are more like plants. They grow out of the soil, built of materials derived from the soil. In the towns it is quite otherwise. Here we have to make an estimate of the local forces in relation to the forces of industrial production. We also have to take individual family incomes into account before we can prepare a sound housing program.

Doxiadis, C.A. Architecture, planning and ekistics —2

5. It has often been said that a family can afford to build or purchase a house of a value corresponding to twice the family's annual income and, in addition, that the family can afford to spend a third annual income upon the plot of land and its development. On the basis of this assumption (which is seldom exactly true) we can start to consider the size of plots and types of houses which would prove economic for the communities for whom we have to plan. In spite of all efforts to design the cheapest type of dwellings for the lowest income groups we have been forced to recognize that it is impossible in most parts of the world for the lower income families to pay for the cost of land and land development. There is a very simple reason why this is so. While it is neither unreasonable nor impossible for a family to pay for the cost of constructing a house within the period of a single generation, it is a very different, and far more difficult, thing to expect it to pay within the same period for all urban services. While houses are usually built for a family - for a generation - towns and cities are built for centuries. For instance the handsome public parks and other public open spaces of most large cities have been created gradually and paid for over the lifetime of many generations. If we want to create a viable part of a city within a single generation then someone has to assist the families of the lower income groups - at least to the extent of the costs of land development.

6. This has brought us to the realization that government assistance, or subsidy, is necessary for one third, but probably only for one third, of the total cost of a house. This third is towards the cost of community facilities, which have to be planned, as carefully as the house types, on the basis of the family incomes; realizing for instance that the ratio of pedestrian paths and vehicular roads to plot area is highest for the small houses of the lowest income groups. Unless these problems relating to the provision of community facilities are realized and faced from the start we risk repeating what has happened in almost all cities of the world: that they do not have the normal range of community facilities for their entire population. I know some cities where it will take about a century to pave all streets and supply all houses with water, even if the population were to remain static.

7. This is the dilemma into which we are led if we do not proceed on the basis of a sound economic analysis. For instance in many countries it is usual to build rows of houses sufficiently far apart to allow for a 40 foot road for cars. The fact that in this income group there are no cars and that these 40 foot streets are going to be left unpaved - thick with dust or mud - is overlooked. A good economic analysis can help us to arrive at a more rational and humane solution. We found in Baghdad that if we made 10 foot lanes we could afford to pave them, drain them and bring water along them to every house. At the same time these short narrow streets kept cool because they funnelled the breeze and at least one side of the street was always in shadow. We found that as soon as a street was wider than 20 feet it became too wide to funnel the air and create a breeze.

Doxiadis, C.A. Architecture, planning and ekistics --3

8. A program for rural housing can provide another example of relating economic analysis and the fourth dimension of time. The annual income of most rural families is unable to justify the erection of more than a two or three roomed house at the most. But we know that these large farming families need much more than that. They also need stables, store houses, etc. How can we reconcile these facts? And how can we explain the present existence of older peasant houses far larger than these economic means permit? The fourth dimension provides the answer. Peasant houses are normally built over the generations: each generation inheriting something from his forebears and adding more. If we take this into consideration we realize that in rural areas we need to plan for growing houses: houses which can start small and continue to expand, even though we shall only build for immediate use.

9. Some other considerations come into planning for a rural village. Almost whenever I have seen villages designed by planners they have been failures. The reason is that planners are usually urbanites and they have the sensitivities of an urban animal: that is to say they are attracted to everything that is in opposition to the congested city. They dream of green spaces and parks and they want to bring their dreams into the villages. But the peasant, in all the countries I have worked in, is a man who hates what we call beautiful. He has none of the romantic spirit which rejoices in regarding a tempest from the windows of an air-conditioned apartment. He has no feeling that nature is his friend. He knows nature as the great enemy against whom he has to fight all his life, whom he wishes to control and keep at bay. This is why villages need to be compact in their planning. I have seen new villages built both in India and Pakistan which have been abandoned by the peasants because their central squares were 200 meters by 600 meters. When I asked why the people were going I was told "I have to walk enough to the fields and back. I cannot also walk more than 200 meters and again 200 meters back to see my brother. I want to be able to speak to him next door".

10. We have to plan in scale with the habits of life of people and also with their means of transporation. One day, standing on the Acropolis and looking out over Athens, I began to realize the mistake we were making in not adjusting the size of city blocks with the changes in our way of living. If we are dealing with a small city, the old model may still suffice, but the greater the city the greater its individual units must be. In Iraq we found that the smallest unit we had to consider was a complex of 10-20 houses connected to another similar unit by a small open square where the women and small children could meet and play. These built up into a community centered around a playground for children of elementary school age. These again grouped themselves into what we called a Class IV community of about 1000-1500 families with school, church (or mosque) and a market place. Instead of the notion of the city as a collection of city blocks we come to the notion of it as a collection of communities. The cars stay outside these communities. Children go to school, men and women go to the central square, the market, shops, health center, church without being disturbed by cars. Similarly the cars are not distracted by pedestrians and can move swiftly along the outer roads.

Doxiadis, C.A. Architecture,planning and ekistics --4

11. In the same way roads are related to the sizes and types of the communities paved footpaths in the smallest ones and service roads entering the larger ones. We find we are able to differentiate clearly between pedestrian ways and vehicle routes and give each the form and dimensions suitable to it. In developing this system we find that the only places where the area covered by roads and paths becomes high is in the middle income districts. In the low income districts there is no necessity for so many roads and in the high income districts the house plots can be much larger.

12. Now, we need to turn from the individual city to the region and look at some of the inter-relationships there. For example, take one of the many small islands of Greece. From the administrative point of view it may be linked to another larger island, but from the economic point of view it very likely has far stronger links with another, and educationally it may have its main ties to a third, and so on.

13. The administrative pattern is almost always the result of many centuries of human history and is very seldom related to rationality. After much thought, discussion and research we have come to the conclusion that the only basis for a regional plan is to find out how the people themselves are functioning in a certain area: how many use which center and for what purposes. As a result of this we begin to build up what we call natural regions, which are of necessity not permanent because, for instance, a new major highway can easily upset the existing pattern very considerably. But at present they form a natural basis for the consideration of regional problems.

14. When one works from this premise one comes upon the hexagonal pattern of settlements first conceived by Christaller in Germany in the early 1930's. I have seen this pattern of natural regions take exact form in certain areas of Punjab where one can find villages with six radiating roads which lead to other villages, one of which is the center of six smaller ones and is itself one of 6 larger villages which have a common center, and so on, forming larger hexagons with centers of ever increasing importance.

15. We are now living at an historic moment in time: the moment when we realize that architecture and city planning, as we have understood them in the west, are not enough. That the western techniques which we have adopted are too limited: that we must take a step forward and develop a new science - a science of human settlement or, as I call it, EKISTICS from the Greek word "OIKO" meaning to settle down.

HOUSING

D.E.I.Q.W

Great Britain, Department of Scientific and Industrial Research, Colonial Liaison Office.
HOUSING AND PLANNING IN SINGAPORE, 1957.
Overseas Building Notes, No. 56, November 1958, pp. 1-13. Illustrations.
333.332 : 711.16 (59)

1. This is a summary of the Annual Report for 1957 of the Singapore Improvement Trust and also of the Final Report of the New Towns Working Party of the Plan for Queenstown, Singapore—the latter being published in 1958.

2. The Singapore Improvement Trust, which was established in 1927, will probably cease to exist in its present form during the present year. It is to be replaced on the one hand by a new Housing and Development Board and on the other hand by a Government Planning Organisation. Mr. J.M. Fraser has been connected with the work of the Trust since its inception, and he retired from the Trust's services in July, 1958. The structure of the Trust's organisation has been described in an article by Mr Fraser in EKISTICS, October 1957, HIB-GA 25, pp. 37-38.

Housing Progress and Needs

3. By the end of 1957, the Trust had built 16,875 dwellings, all but about 2,000 since 1946. During 1956 and 1957, lack of cleared sites delayed progress, and in 1957 only 1,274 dwellings were completed. Nearly 5,000 more were under construction at the end of the year. There were then some 13,000 family applications on the housing register, and some 3,250 families waiting to be rehoused from clearance areas. Given the cleared sites and other necessary facilities, the Trust could build 5,000 dwellings a year in permanent construction of good standard.

4. The 1955 Master Plan estimated that 10,000 dwellings a year would have to be built if the housing needs of Singapore's rapidly increasing population were to be met. An additional 1,600 per year were needed to replace obsolescent housing stock. The 1957 census results showed that these were underestimated. It now seems that 16,000 dwellings a year are needed. Increasing attention will have to be given to control unauthorized building, and clearance schemes in the central area may have to be postponed.

5. A continuing recession in private building in Singapore during 1957 is reported. This was aggravated by the restriction of loans for building by banks and building societies and by the general tone of caution towards investment in Singapore. There was also an increase in the unauthorised settlement of land and the erection of buildings without permission. There has been much discussion of temporary buildings in 'tolerated areas.' The Trust emphasises that this toleration can extend only to the type of building but never to the uncontrolled siting of structures.

Housing Policy

6. The Trust attempted in the past to provide houses of sound construction and good design for the lower income groups at a rental of between one sixth and one fifth of the family income. It continued, by means of rental formulae, to let its housing at economic rents and without subsidy. Faced with rising costs and increasing deficit in housing revenue, the Trust had to abandon this policy in recent years.

Great Britain, Department of Scientific and Industrial Research, Colonial Liaison Office. Overseas Building Notes, No. 56, November 1958.

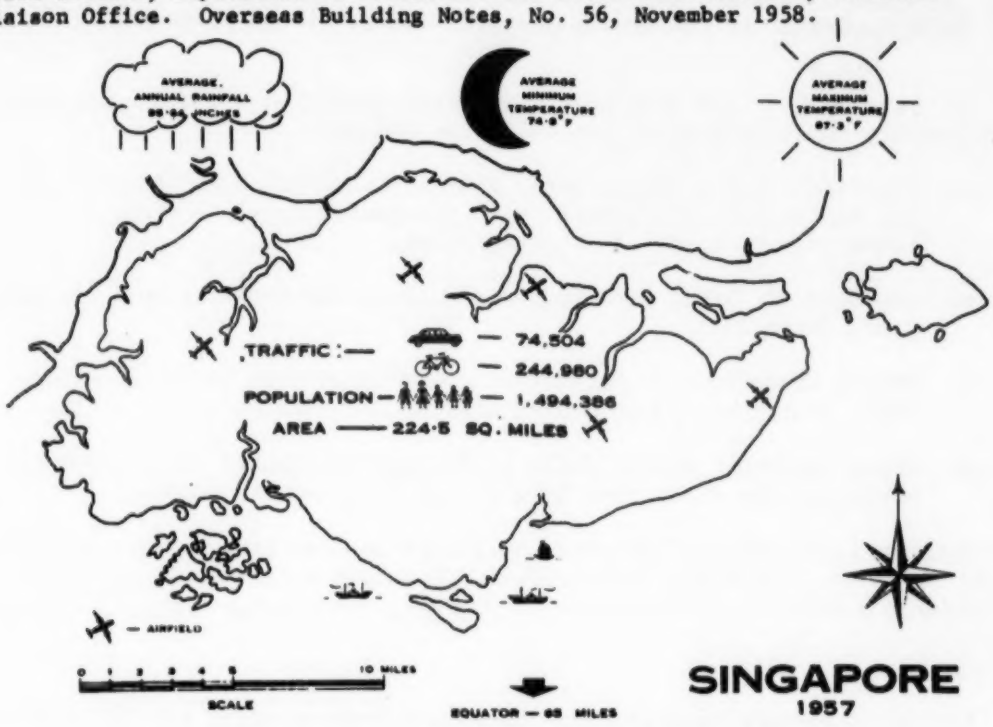


Fig. 1 Singapore, 1957. Facts and figures about Singapore summarised in map form, reproduced from the Singapore Improvement Trust's Annual Report.

Fig.2 Singapore Improvement Trust: Albert House. Flats and shops. Architect A. J. A. Wallwork, A.R.I.B.A.

7. In January 1957 the Singapore Government published a white paper on housing policy which laid down the following points:

a. The Trust would borrow money from the Government for housing at the market rate of interest with repayment of principal and interest over a period of sixty years.

b. The cost of land, site preparation and construction would be paid from these loans.

c. Public rents in each particular project would be fixed by Gobernment, having regard to the ability of the average tenant to pay.

d. Where the rent income fails to balance the expenditure, Government would pay the difference in the form of an annual subsidy.

Other changes in policy included the relief of tenants from service charges such as the running of lifts and provision of common staircase lighting and the establishment of a repairs fund.

Major Housing Activities

8. Two major schemes in which the Trust has been occupied are the development of the satellite suburb of Queenstown, and the old airport site at Kallang. Other projects include two further Central Area Redevelopment schemes consisting mainly of two-room flats with shops on the ground floor and office accommodation. At the end of 1957, about 7,000 dwellings had been programmed, most of which were under construction. A further programme for some 6,600 dwellings and a number of shops was with the Government for consideration. Most of the dwellings being built were flats, but there were some two-storey row houses.

9. The area of the Queenstown planning district is about 1,150 acres. Of this, about 570 acres are to be developed by the Trust as a satellite suburb at an average net residential density of 200 persons per acre. Part of the area will be developed with tall blocks of flats (at densities of up to 400 persons per acre) and the other parts of the area will have low blocks and row houses (at about 150 persons per acre). Open spaces are planned at the scale of 1.76 acres for 1,000 population. Queenstown is to be divided into five neighbourhoods, each with a market and shopping centre. The first neighbourhood, where 18,000 families now live, was completed in 1956. The second neighbourhood is under construction. The scheme should be completed in 1962, serving a planned population of about 53.000.

10. Kallang airport site is being partly developed for housing by the Trust. About 3,000 houses and flats, of which some 2,700 are under construction, will be built. Shops, markets, shop industries and schools will also be provided.

Great Britain, Department of Scientific and Industrial Research, Colonial Liaison Office. Overseas Building Notes, No. 56, November 1958.

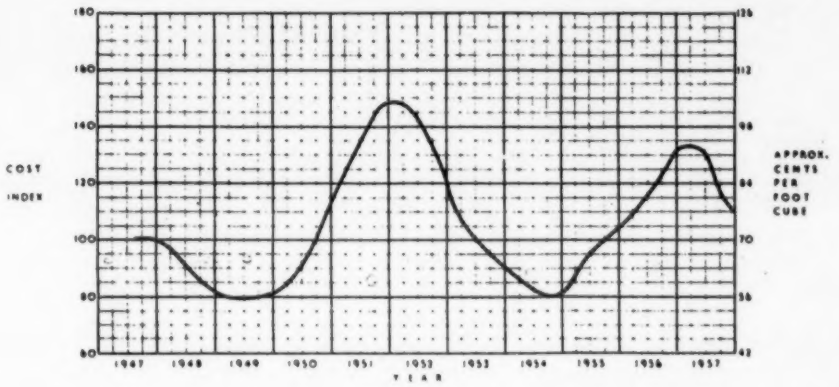


Fig.6 **Singapore Improvement Trust: Approximate building costs for low-cost housing.** Base 100 = approx. 70 cents. (about 1s. 8d.) per foot cube, excluding roads, drains, piling and major earthworks. The index number for 1940 was about 30.

WHERE THE MONEY GOES !

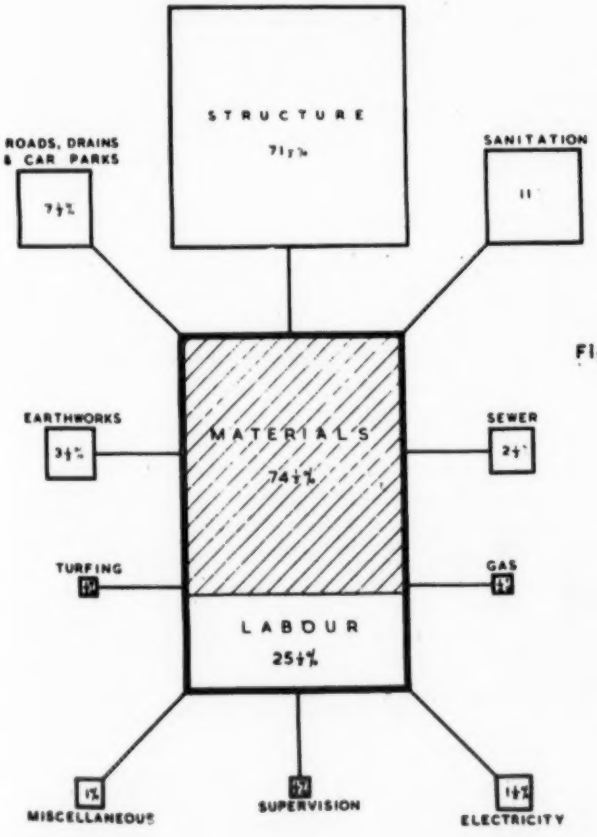


Fig.7 **Apportionment of the cost of S.I.T. low-cost housing between the various components.**

Land Clearance and Resettlement

11. People affected by land clearance have been grouped into three categories:

a. Urban dwellers, who required accommodation in the city by nature of their employment.

b. Semi-urban dwellers, who required accommodation on a small plot of land in a locality where they could carry out their occupations (usually including part-time market gardening) with a feeling of security.

c. Farmers, who required resettlement on an area suitable for agriculture, with security of tenure so that they could invest in improvements.

It was estimated in 1956 that there were 2,800 families needing immediate resettlement.

12. For the farmers a comprehensive scheme of compensation was recommended with plans for resettlement in the rural areas. Each family was to receive a suitable plot of land up to two acres at a very favourable rental together with a basic house of timber, with a thatch roof, placed on the land free of cost. Non-farming families were to be resettled in free basic houses in urban sections of resettlement areas, being transported free to the new dwellings. Alternatively, they were to be given priority on the Trust's housing list.

13. The Trust was invited to act as the land clearance and resettlement authority. Accordingly, it set up a new Land Clearance and Resettlement Department embodying the former Lands Section of its Estate Department, which had responsibility for surveying and designing areas of land suitable for resettlement, and the Resettlement Engineering Section of the Land Office, which had started work in construction roads and drains in resettlement areas. Additional staff, mostly with experience of similar resettlement work in the Federation of Malaya, was recruited.

14. One-fifth of Singapore's total area has been examined for resettlement purposes, and 18 areas covering over 3,500 acres were selected for immediate attention. Funds have been voted by Government for resettlement work and plans are well advanced. But progress with land acquisition is reported to have been slow and some sites are still becoming encumbered with more squatters.

Planning

15. The principal duties of the Trust's Planning Department are:

a. The General Improvement Plan, consisting of four functions. First, is the preparation and maintenance of a General Improvement Plan itself, a series of cadastral and topographical maps at various scales, which are together a record of all decisions of the Board

of Trustees about the disposal and use of land and of the planning schemes and layouts approved by the Government and the Trust. Second, is the sale to the public of copies of General Improvement Plan, or extracts from it. Third is replies to legal inquiries concerning the provisions of the Plan. And fourth is the certification of building and other plans (for submission to other authorities) as being in accordance with the General Improvement Plan.

b. Development Control, also consisting of four functions. First, the examination and submission through the Planning Committee to the Board of Trustees (with appropriate information) of applications received for permission to dispose or change the use of land, to subdivide or amalgamate defined lots, or to change the use of buildings. Second is the recording and puplication of planning decisions. Third, the Department replies to inquiries about the possible use of land or buildings. And finally, it maintains liaison with all those departments of dentral and local government concerned with the use of land and buildings.

c. Improvement Schemes: These involve the preparation of detailed approaches to the improvement of specific areas of land, including slum clearance and road improvement.

d. Replanning. This involves the preparation of detailed plans to fulfil the provisions of the Master Plan relating particularly to the central areas and to the improvement of existing and proposed major traffic routes and junctions. This division was set up during 1957.

16. The Master Plan was the subject of an inquiry held by a Town Planning Inspector seconded from the United Kingdom Ministry of Housing and Local Government. The report of the inquiry was considered by a Committee of the Council of Ministers in Singapore during 1957, and this body recommended the adoption of nearly all of the amendments to the Plan suggested by the inquiry. The submission of the amended Plan for final approval by the Government, however, had to await legislation designed to implement its proposals.

17. Recently the Master Plan Team has been completing a number of surveys, including an up-to-date assessment of all <u>attap</u> (thatch) and other temporary dwellings in and around the city.

D.E.G.N.S.T.

Podwapinski, W.
LOW-COST HOUSING IN LIBYA
United Nations, Report. 8 December, 1958.
728.37 (61)

1. This is an appendix to a report to the United Nations, covering the period from late July through late November, 1958. W. Podwapinski is a Low-Cost Housing Expert from Poland serving with the United Nations Mission in Libya. We have selected certain interesting points and illustrations from his report.

2. The future of low-cost housing in Libya is felt to lie in the wide use of gypsum, of which there are enormous unexploited deposits. The gypsum is of such high quality and of such easy access that it should be attractive both for local use and also for export. The deposits were being surveyed by USCM geologists at the time the report was being written; and their report with geological map has probably been published by now.

3. Following studies of local social, climatic, religious and economic conditions, the following basic principles were adopted for designing low income Libyan dwellings:

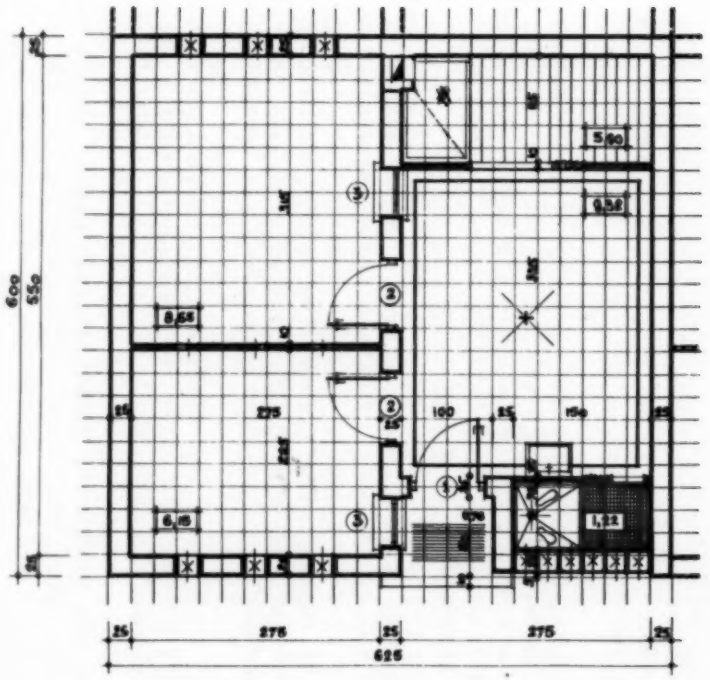
a. Minimum standard: 3.5m per person of living area under the roof. (This is 1/2 of standard set in Poland, 1/3 of the standard for England and 1/5 of the standard for public housing in the United states.) The amount set as a minimum for Libya is felt to be sufficient area for quite comfortable sleeping, if adequate ventilation is secured.

b. Whatever the area allocated, no more than two persons per room. This rule makes the average room rather small, but this is agreable in Libya if a central open courtyard is provided.

c. The "Pompeian" type of plan was adopted. This kind of plan, with its own courtyard in each house, is favoured by the Libyan population since it allows women to move freely within the bounds of the house without being seen by outsiders.

d. Sanitary equipment: Whatever is economically feasible is provided in each household. The squatting type of toilet with an overhead shower and a wash-tub and a sink on the courtyard side has been found a satisfactory arrangement. Lack of individual sanitary equipment in some post-war housing built in Tripoli is strongly resented. Moslem men pray five times a day, and before praying they must wash themselves thoroughly in running water.

e. Construction: Modular co-ordination was adopted throughout. The basic module is 25 x 25 x 25 cm. This allows for quite free interchange of the construction material -- beginning from rammed earth construction, rammed earth blocks, local stone in blocks, different types of cement-concrete or gypso-concrete hollow blocks up to monolithic walls made of gypso-concrete.



B

2 ROOMS UNIT • 3-4 PERSONS

LIVING AREA UNDER THE ROOF	•	14,80 m²
SUBSIDIARY AREA	•	14,60 m²
TOTAL AREA	•	29,40 m²
BUILT OVER AREA	•	37,60 m²

Podwapinski, W. Low-cost housing in Libya -2

f. Standardisation: All building elements (doors, windows, sanitary equipment, vents, roof parts, etc) also follow strict modular co-ordination methods and are standardised and exchangable. This in itself leads to a reduction of time and costs on all jobs.

4. Illustrative materials provided included the following: (selected examples)

(Sheet No. 2) Plan of the two-room house type "B" for three-to-four persons. This is the smallest unit.

(Sheet No. 4) Plan of the four-room house type "D" for seven-to-eight persons.

(Sheet No. 8) Typical cross-section showing the height of ceiling, which is kept minimum with the condition that permanent cross-ventilation is provided under the roof-ceiling. It was found that for comfort in a warm climate excessive heights of ceilings were not necessary. Rather, the ceiling needs to be kept cool, and this will depend on the construction of the roof and ceiling so as to keep the lower portion as cool or cooler than the room air temperature.

(Sheet No. 9) Entrance elevation of the two type "C" houses in semi-detached group.

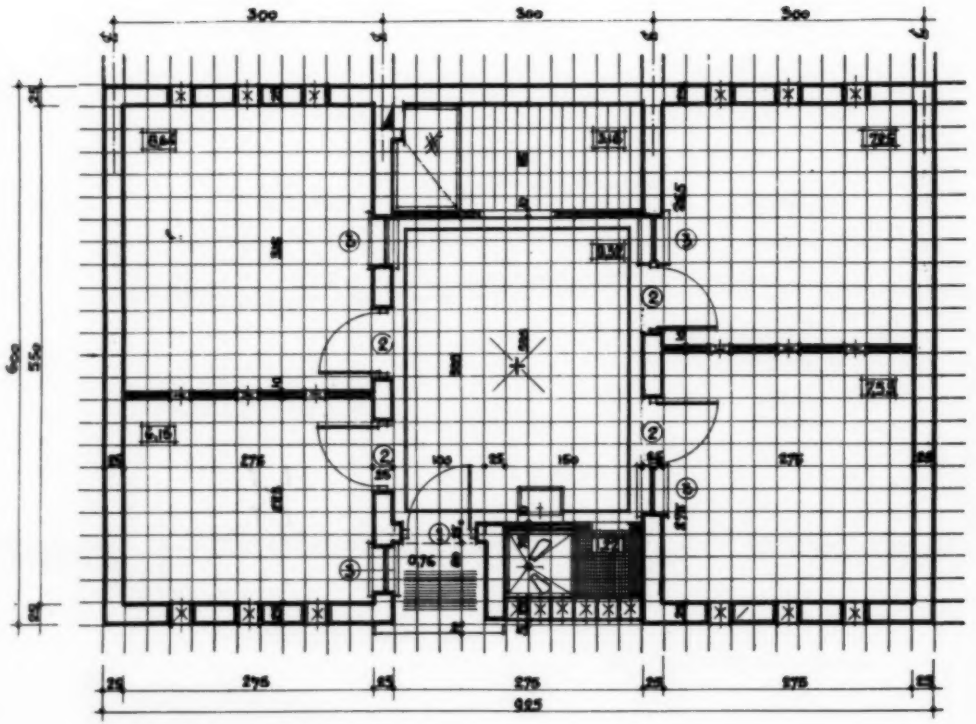
(Sheet No. 10) Detailed plan for economical doors and windows. Presently used wooden sections are greatly oversized in Libya; and it was felt that in a country having no local timber, extra efforts toward rationalization should be taken.

(Sheet No. 11) Detailed concrete precast toilet - shower - sink unit. The unit has all essential features: squat type toilet, shower overhead in one side and the wash-tub on the other. All outlets drain through concrete soil pipes into the squat toilet whose trap can be the only siphon for the entire house.

(Sheet No. 15) Hollow blocks and panels -- dry method of wall construction (Gregan system). Very economical because of building speed, simplicity of the assembly, slight transport cost. Large hollows are filled with the chippings, sand, slag, etc. available on the building site. With the forthcoming exploitation of gypsum deposits in Tripoli, this construction method might soon prove its advantage.

(Sheet No. 17) Gypsum roof construction. Method of producing gypsum hollow roof elements together with designed wooden forms. (To be handled by unskilled labour.)

(Sheet No. 20) Monolithic gypso-concrete walls. The method resembles to a certain extent the rammed earth construction; but it gives a better, quicker and more attractive result with ready-finished surfaces. The expenditure of gypsum is about 250 kg for one cubic meter of wall.



4 ROOMS UNIT • 7-8 PERSONS

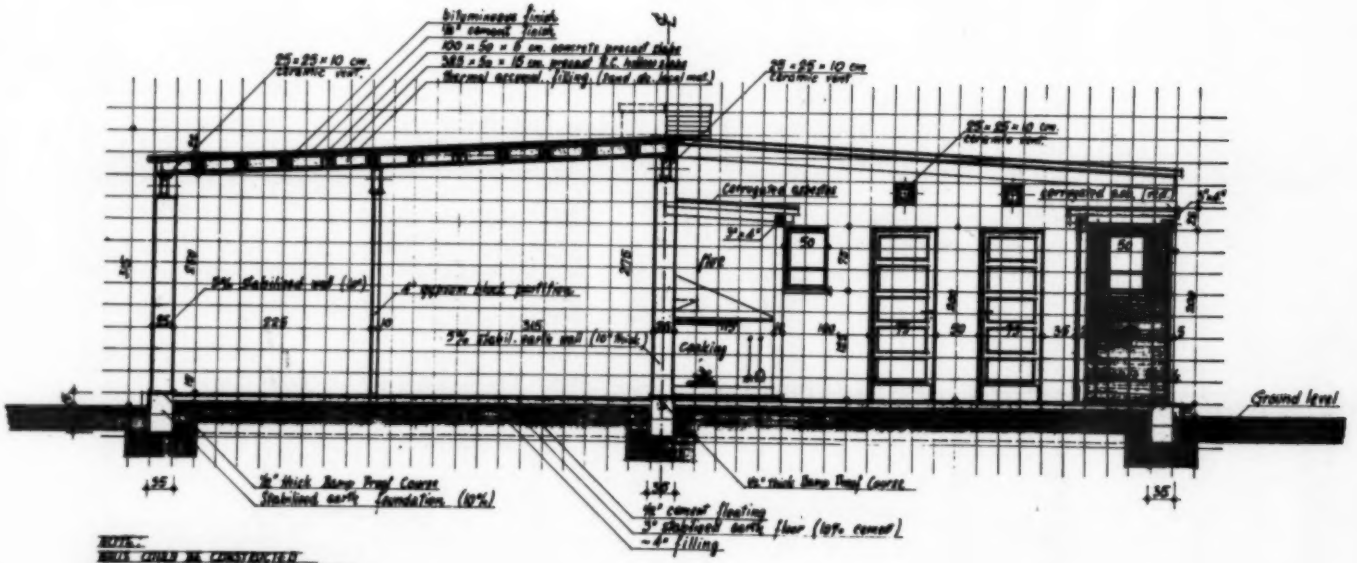
LIVING AREA UNDER THE ROOF	• 27,50 m²
SUBSIDIARY AREA	• 14,60 m²
TOTAL AREA	• 42,10 m²
BUILT OVER AREA	• 55,00 m²

Podwapinski, W. Low-cost housing in Libya -3

As a filler the local gargaresh stone could be used in chippings 20-100 mm. The crushing resistance of walls constructed in this way after 7 days setting is up to 70 kg/cm^2. (The method was developed in Poland and has been used extensively there with excellent results.)

(Sheets Nos. 21-25) These illustrations represent the study design of a rural house for Tripolitania. Keeping in mind the possibility of the resettlement of the people from overcrowded urban areas to the agricultural areas, the Government of Libya asked Mr. Podwapinski to prepare a study of rural housing. This is one of the houses prepared for that study. Three rooms, a stable, cooking, and sanitary compartments are grouped around the central courtyard with shaded parts. It was thought that rural houses should be rather more attractive for the occupants than urban ones, in order to provide additional incentive for peasants to stay in the country.

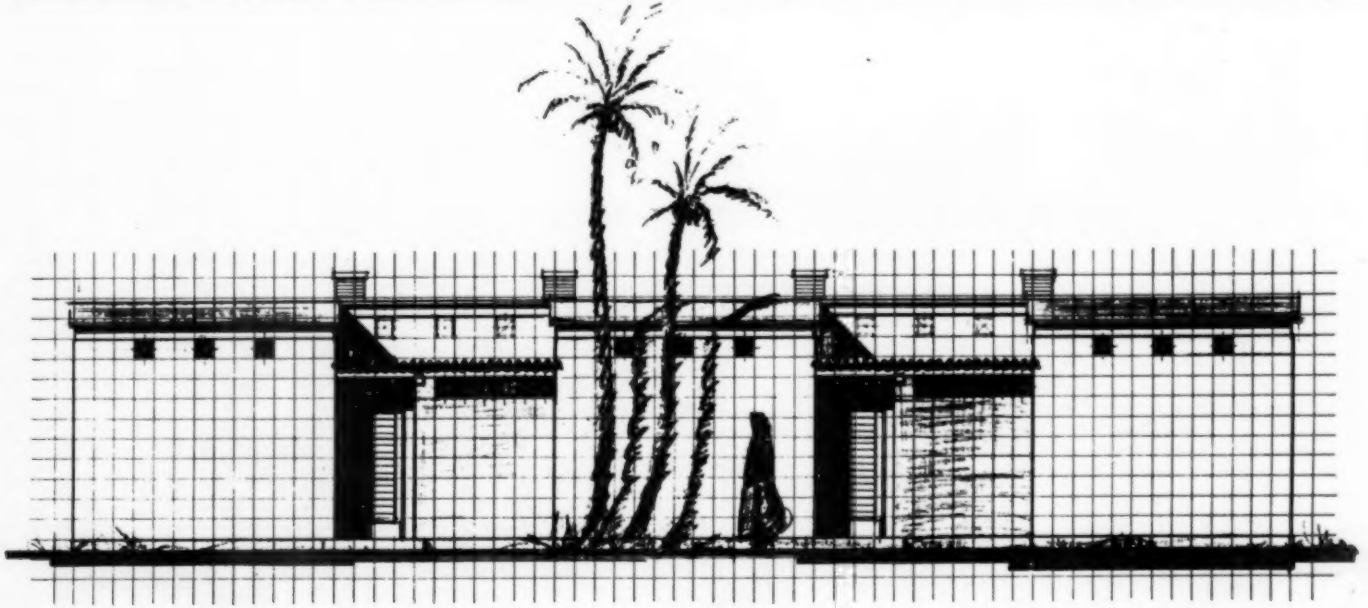
LOW COST HOUSING IN LIBYA


Bituminous finish
½" cement finish
100 = 50 = 8 cm. concrete precast slabs
385 = 50 = 15 cm. precast R.C. hollow slabs
Thermal accoust. filling (hand pb. blend mat.)
25 = 25 = 10 cm. ceramic roof
Corrugated asbestos
Corrugated asb. roof
9" x 4"
flat
5% Stabilized soil (cr)
4" gypsum block partition
5% Stabil. earth wall (10" thick)
Cooking
Ground level
½" thick Damp Proof Course
Stabilized earth foundation (6%)
½" thick Damp Proof Course
½" cement flooring
3" stabilized earth floor (6% cement)
~4" filling

NOTE:-
WALLS COULD BE CONSTRUCTED IN ALTERNATIVE MATERIALS SUCH AS:- HANDMADE STONE, BRICKS, GYPSUM BOULDER BLOCKS AND PANELS, GYPSUM-CONCRETE BLOCKS, CEMENT-CONCRETE BOULDER BLOCKS, RAMMED EARTH BLOCKS, COMPRESSED EARTH BLOCKS ETC. IN EACH INSTANCE THE WALLS DIMENSIONS ARE THE SAME.

TYPICAL CROSS SECTION . . SCALE 1:50

LOW COST HOUSING IN LIBYA



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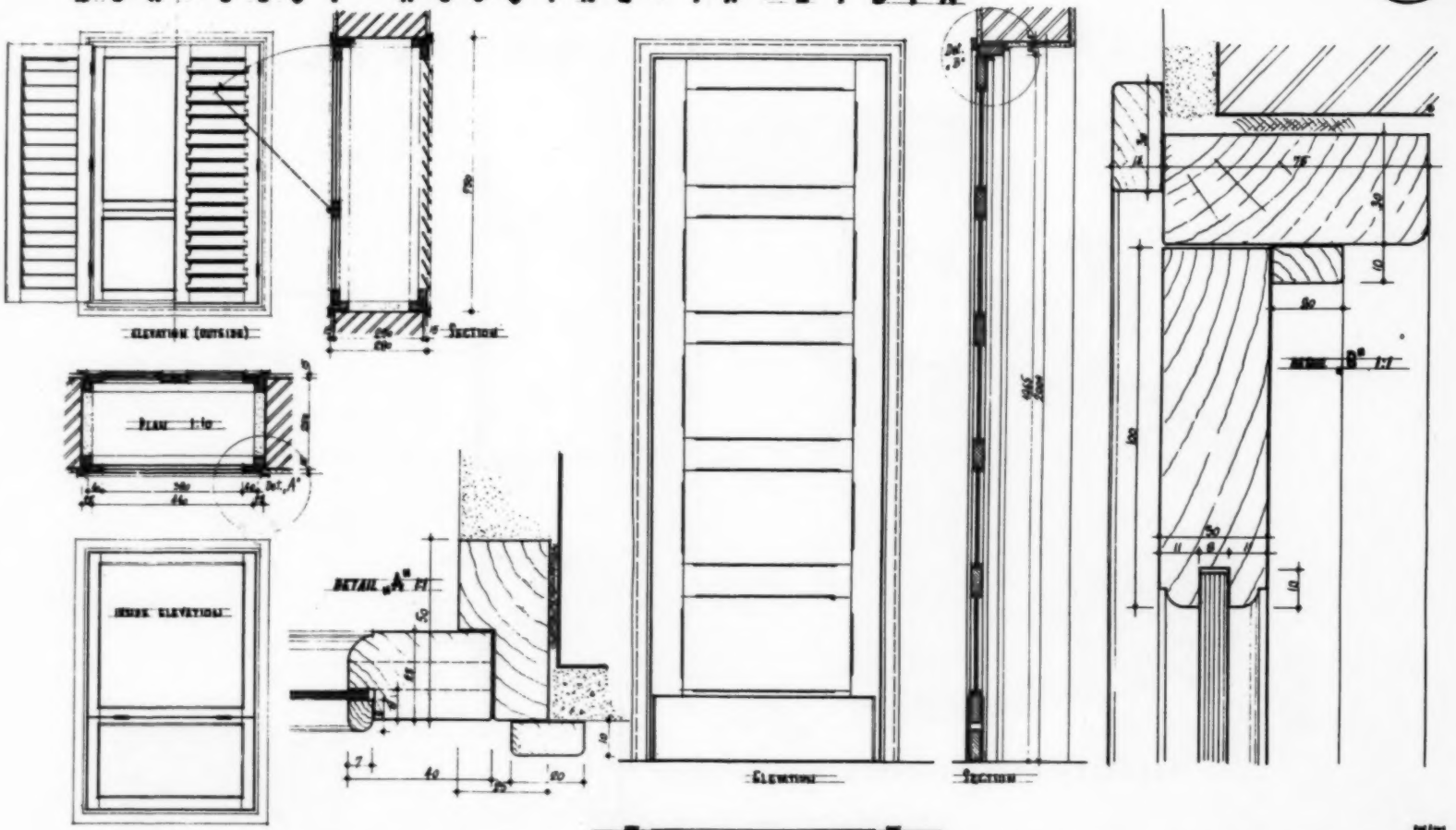
Page 224

ENTRANCE ELEVATION OF SEMIDETACHED TYPE 'C' HOUSE SCALE 1:50

L O W • C O S T • H O U S I N G • I N • L I B Y A

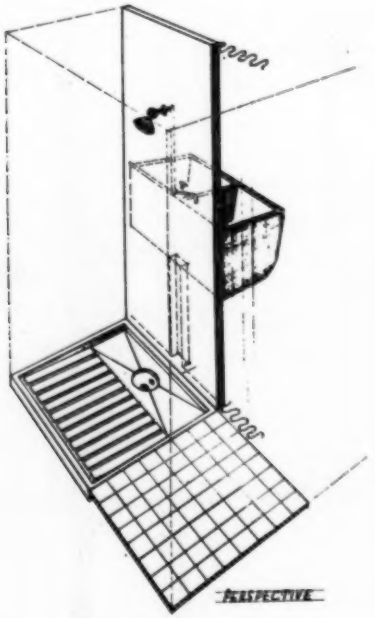


T Y P I C A L W I N D O W

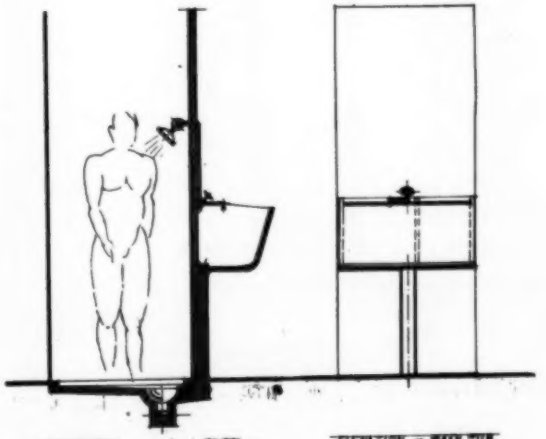
T Y P I C A L D O O R

LOW COST HOUSING IN LIBYA

HB-GA 61
Page 226

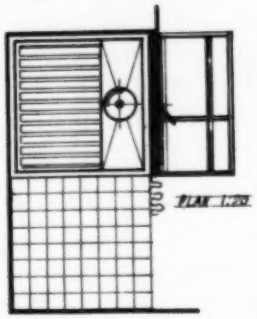


PERSPECTIVE



SECTIONS 1:20

ELEVATION — BATH TUB & KITCHEN SINK 1:20

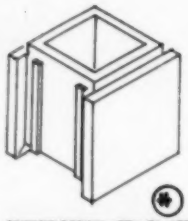


PLAN 1:20

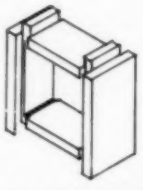
PRECAST CONCRETE KITCHEN-BATH UNIT

THE UNIT HAS ALL ESSENTIAL FEATURES, INCLUDING A SHOWER HEAD AND SQUAT TYPE TOILET IN THE BATHROOM; AND ON THE OTHER - KITCHEN SIDE A WASH TUB AND KITCHEN SINK. ALL OUTLETS DRAIN THROUGH CONCRETE SUB. WORKS INTO THE SQUAT TOILET, WHICH ALSO CAN BE THE ONLY SANITARY FOR ENTIRE HOUSE.

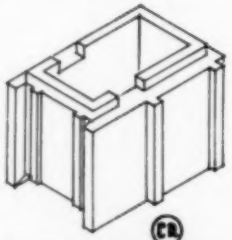
LOW COST HOUSING IN LIBYA



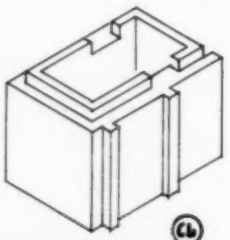
HOLLOW BLOCK 25 × 25 × 25



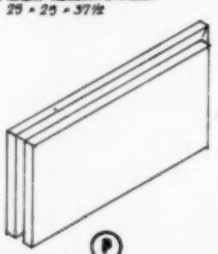
HALF HOLLOW BLOCK 25 × 25 × 37½



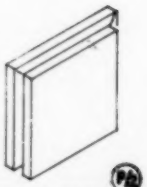
CORNER RIGHT HOLLOW BLOCK 25 × 25 × 37½



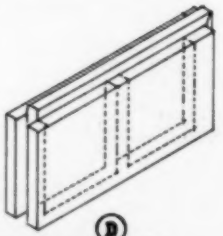
CORNER LEFT HOLLOW BLOCK 25 × 25 × 37½



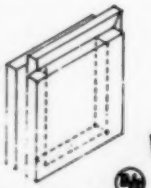
PANEL 50 × 25 × 5



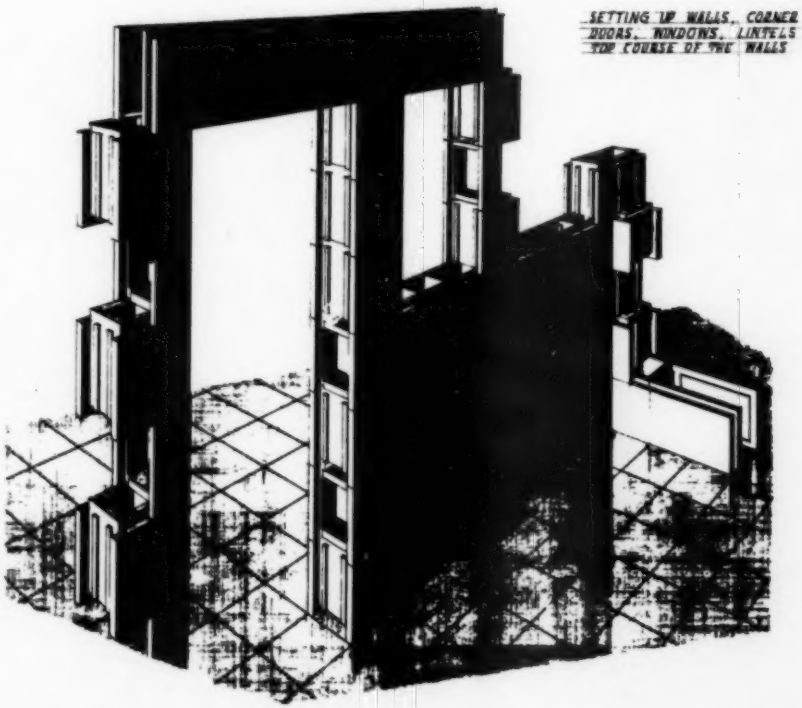
HALF PANEL 25 × 25 × 5



PARTITION PANEL 50 × 25 × 9



PARTITION HALF PANEL 25 × 25 × 9

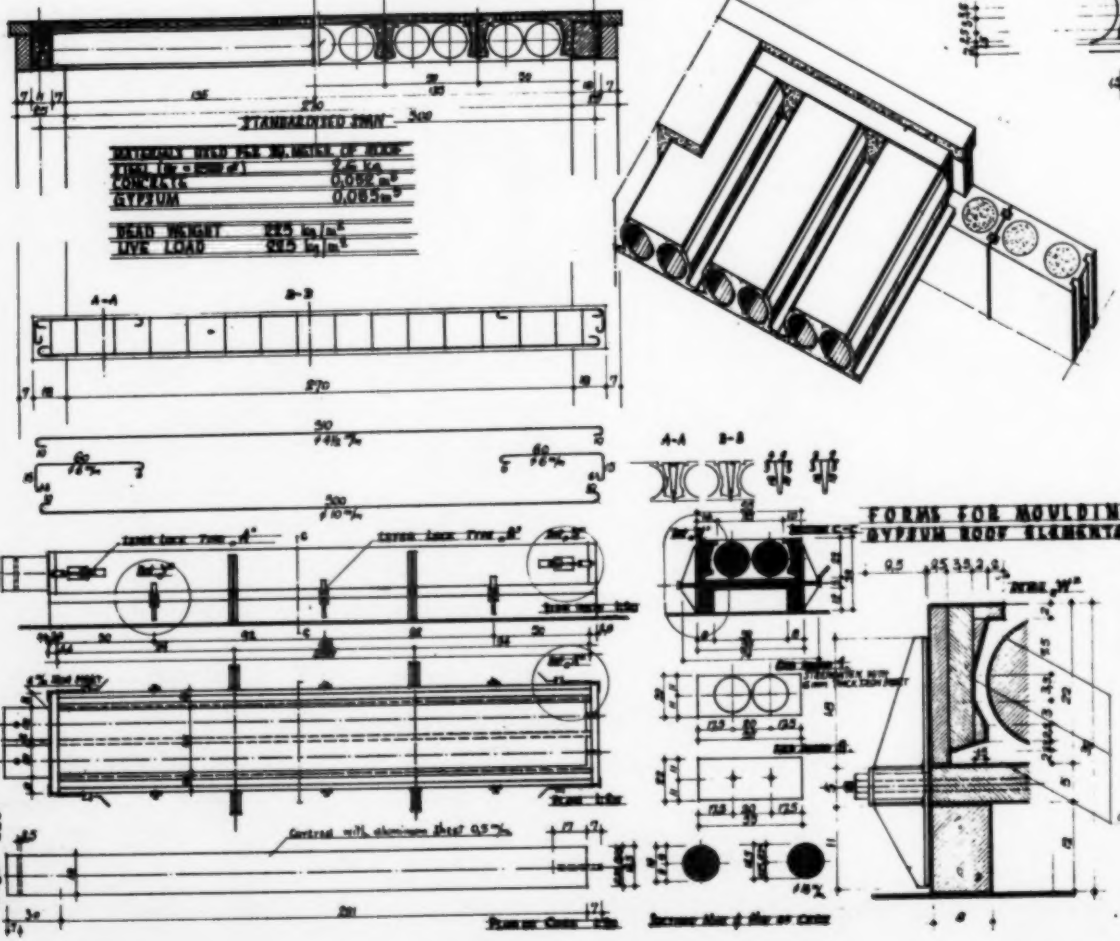


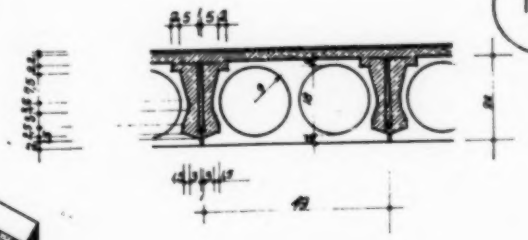
SETTING UP WALLS, CORNER WALLS, DOORS, WINDOWS, LINTELS AND TOP COURSE OF THE WALLS

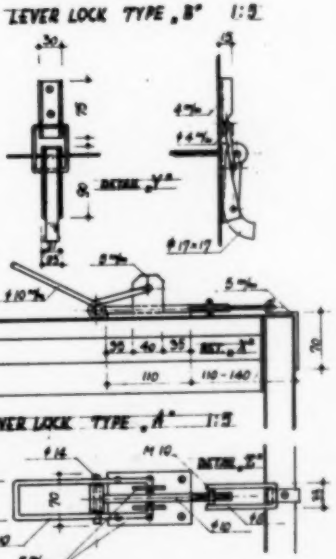
WALL CONSTRUCTION SYSTEM GREGAN HOLLOW BLOCKS AND PANELS

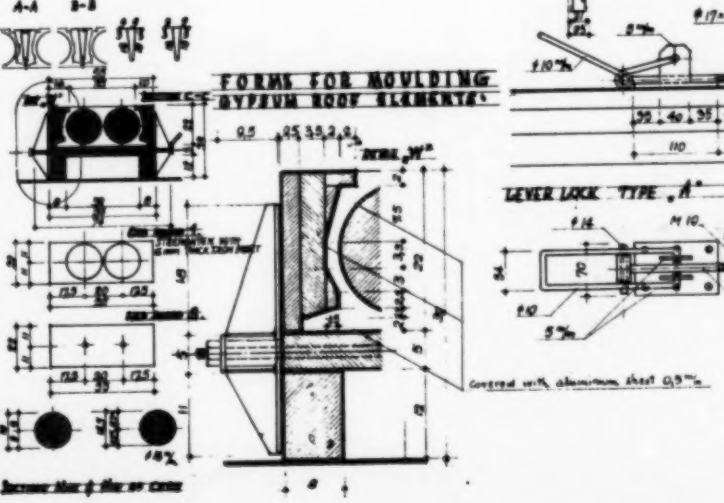
LOW-COST HOUSING IN LIBYA

GYPSUM ROOF ELEMENTS









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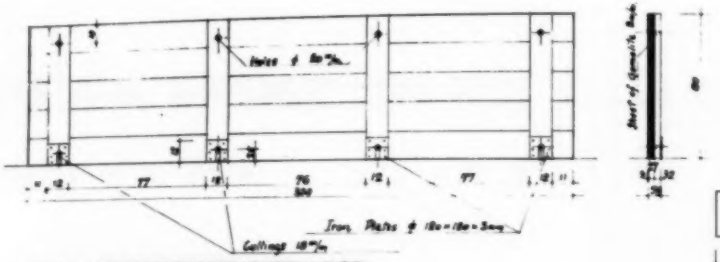
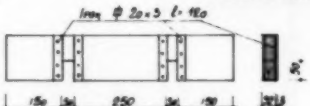
LOW COST HOUSING IN LIBYA

MONOLITHIC GYPSUM WALLS · NEW CONSTRUCTION METHOD

THE BASIS: 1. CRUSHED GARGARESH STONE (FILLER) AND GYPSUM BINDER.
2. CASTING ENTIRELY IN SITU · USING SLIDING FORMWORK
3. EMPLOYING UNSKILLED LABOR (ONLY FOREMAN SKILLED) ·

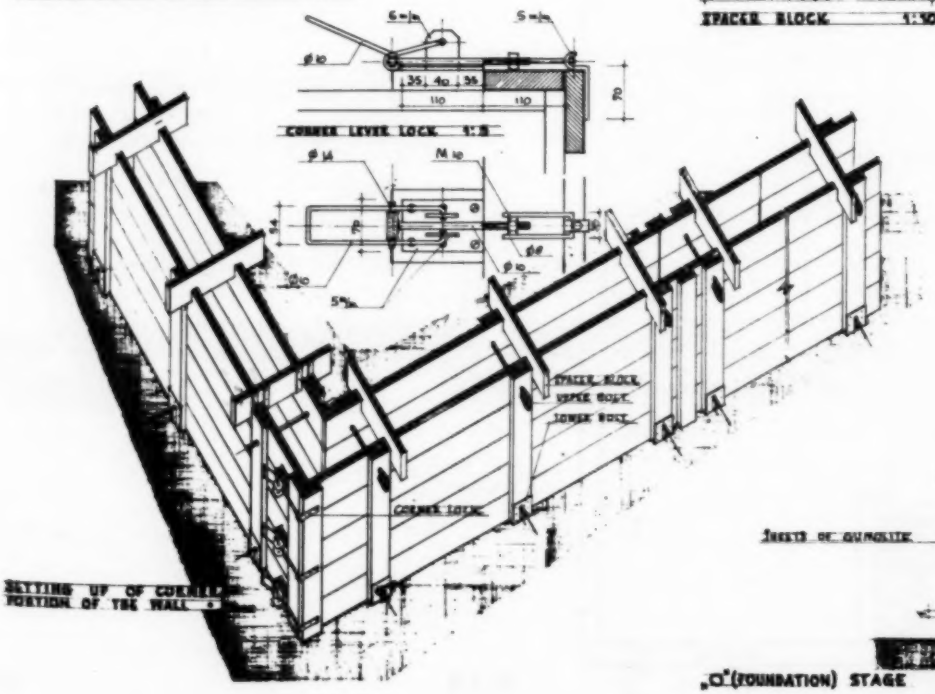


TYPICAL WOODEN SLIDING PANEL 1:20

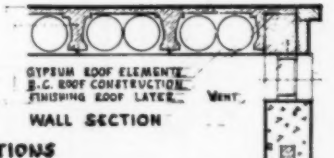


SPACER BLOCK 1:10

LOWER 18 %m SCREW UPPER BOLT ϕ 20 %m 1:10

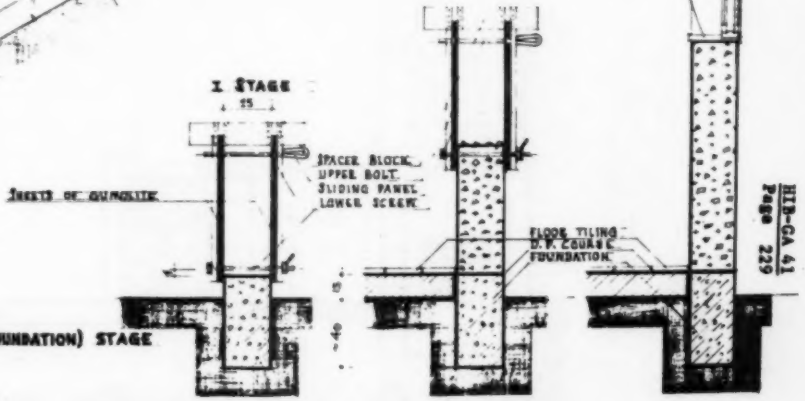


SETTING UP OF CORNER PORTION OF THE WALL



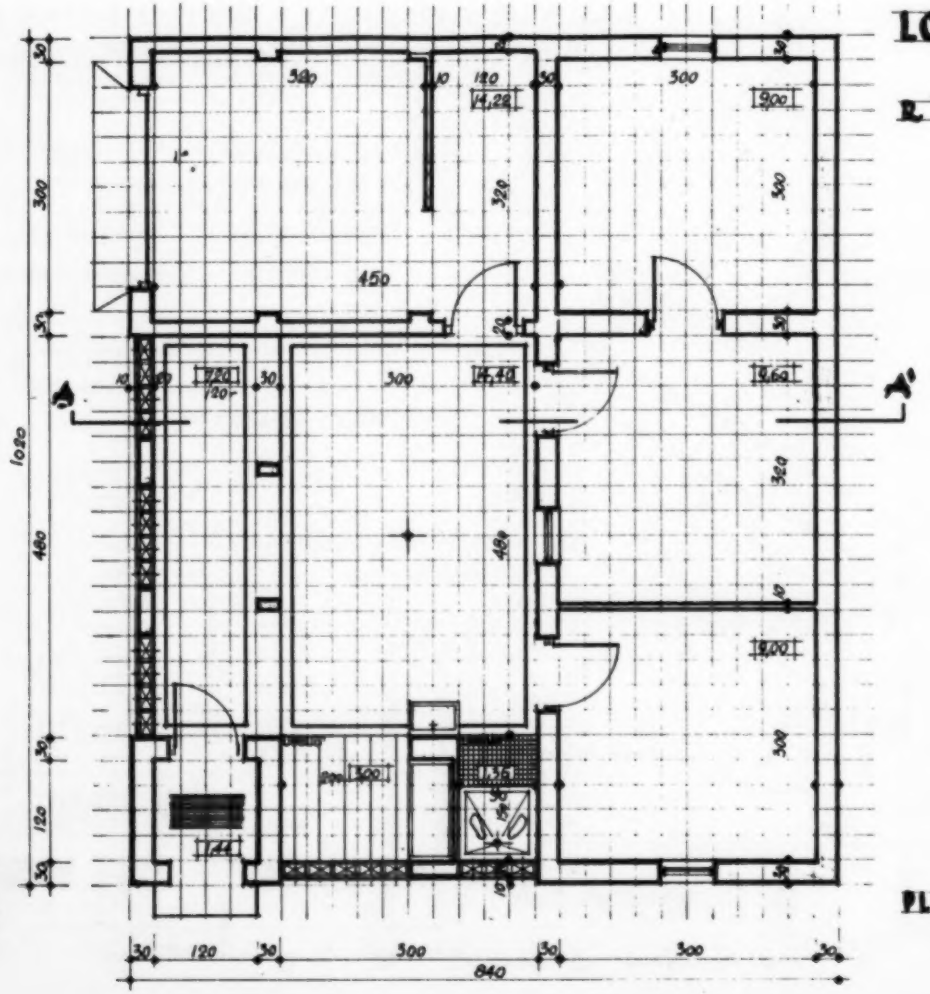
WALL SECTION

SEQUENCE OF OPERATIONS



LOW-COST HOUSING IN LIBYA

RURAL + HOUSING



BUILT OVER AREA	65,68 m²
VOLUME	257,04 m³
LIVING AREA · 3 rooms	27,60 m²
STABLE	14,22 "
CORTILE	21,60 "
KITCHEN	5,00 "
WC, SHOWER	1,55 "
ENTRANCE	1,44 "
TOGETHER AREA	69,21 m²

PLAN 1:50

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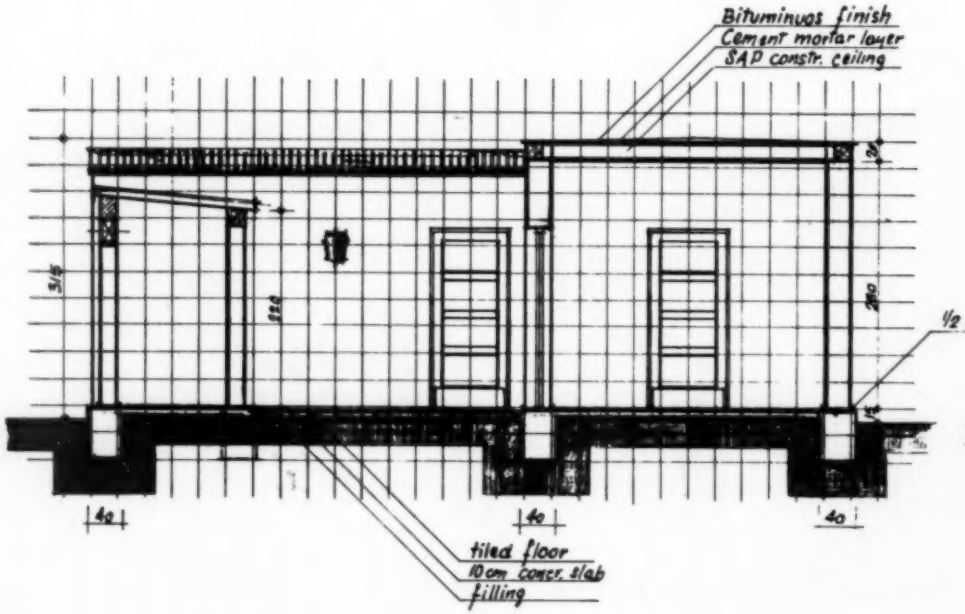
LOW-COST HOUSING IN LIBYA



1:50

SECTION A-A'

RURAL HOUSING

RURAL HOUSING

Perspective

D.E.M.N.W.

United Nations, General Assembly
HOUSING IN NON-SELF GOVERNING TERRITORIES
A/C.4/393, 1 December 1958.
333.32

1. The following extracts are taken from a statement made by the representative of the United Kingdom at the 820th meeting of the Fourth Committee of the General Assembly on 28 November 1958. In accordance with a decision taken by the Fourth Committee at this meeting, the text was circulated to all members as information.

2. In both urban and rural communities there has arisen a need for new forms of organization to replace social structures which have broken down under stresses for which they were never intended. It is the task of the central governments to take the lead in helping to evolve new organizations to look after these matters. Yet it is not for governments, even where they have the resources, merely to pour benefits and services into outstretched hands. This does not create the vigorous communal spirit, the self-reliance, which must be the foundation of a socially healthy country. As has so often been proved by experience, the best long-term policy is the one which shows people how to help themselves.

Housing

3. As in other branches of social development, housing policy in United Kingdom Territories is not directed from London, but is in the hands of territorial governments. Help and advice are given through the Housing and Town Planning Advisory Panel of the Secretary of State for the Colonies, the Colonial Office Housing Adviser, the Colonial Liaison Section of the Building Research Station and in other ways. Substantial sums of money have been provided in the shape of a grant from the Colonial Development and Welfare vote and loans from the Colonial Development Corporation. British experience has been made available through the CCTA and in other ways to non-British Territories. The technical information series, called Overseas Building Notes, has a wide circulation in United Kingdom Territories and elsewhere.

4. Rapid population growth, industrialization and movement into towns have combined to cause some acute urban housing problems in many Territories. The symptoms of these problems are the haphazard urban growths and settlements which develop around growing towns, and the overcrowded centres of some of the larger cities. This of course is a problem which is found in many parts of the world, not only in non-self-governing Territories. Equally general is the problem of making limited resources of skilled labour as well as of money go as far as possible. In an effort to mitigate this problem and develop balanced housing policies, a number of Territories have drawn together the policy functions in the housing and planning fields and formed Housing Ministries. One of the tasks of these new Ministries has been to decide how much Government should do itself and how much should be left to non-governmental bodies and building firms, stimulated when necessary by government.

5. Different solutions have been adopted in different Territories. In Singapore, for instance, the main effort, until very recently has been made through the Singapore Improvement Trust, which had by the end of 1957 built nearly 17,000 houses, nearly 700 shops and 11 markets. The Trust had important planning responsibilities but, following the preparation

of a master plan for the Territory under the auspices of the Trust and with the help of a number of consultants, the Government has now taken over responsibility for town planning. The use of a central Corporation or Trust, to do the work usually done in the housing field in the United Kingdom by local authorities, is still common in non-self-governing Territories. In Hong Kong the Housing Authority has been building high flats in impressive numbers to be let at economic rents; this scheme, when complete, will house over 31,000 people in over 5,000 flats on a 19-acre site. In Lagos the Executive Development Board is replanning and building in the centre of the city, and in Western Nigeria a Housing Corporation has been established. In parts of East and Central Africa local authorities are shouldering responsibility for housing. In Nairobi, for instance, the City Council with the co-operation of the Government has recently launched a large housing scheme.

6. The actual building of houses is of course only a small part of the Governments' activity in the field of housing. In addition it has responsibilities in connexion with the administration of building regulations and labour housing, and also as an employer for housing its own workers. Town planning legislation and the provision of planning machinery has recently received attention in a number of Territories; in Zanzibar and Barbados, for instance, as well as in Singapore. Added stimulus to these activities has been provided recently by the addition of an overseas section to the Town and Country Planning Summer School held annually in the United Kingdom, which provides a forum where planners and others concerned with town planning can exchange experiences and keep in touch with developments outside their own Territories.

7. In some Territories self-help housing schemes have been started with government assistance, usually in rural areas. A number of self-help groups are at present building houses in this way in British Guiana, British Honduras and Trinidad. I have seen these self-help schemes operating very successfully and simply in rural areas in several parts of Uganda.

8. In the field of housing finance, Territories have borrowed and adapted a number of devices both from the United Kingdom and elsewhere. One of the most interesting is the building society method of financing housing for the growing wage-earning population. A notable success has been achieved in this method in Singapore and more recently in the British Territories in Borneo. This development has been helped in its initial stages by the pump-priming activities of the Colonial Development Corporation and by money raised on the market in Singapore and guaranteed by the Singapore Government. In Lagos, the Federal Government has collaborated with the Colonial Development Corporation in establishing a building society. Building societies on more orthodox lines, placing more reliance on small savings, are at work in the Caribbean and in East and Central Africa. There are also a number of housing associations and Government loan funds lending money for building housing for civil servants and others in employment; and there are co-operative housing societies, among which those in Hong Kong and Singapore have had particular success.

United Nations. Housing in non-self governing territories --3

9. Finally, on housing it is interesting to note that in a number of small and unspectacular ways those concerned with building in Public Works Departments and other organizations are encouraging and training local staff to learn more about their work and to do it better. Whenever a local town planner completes his training or an African builder secures a contract as a result of friendly encouragment of this sort, a useful step has been taken in the direction of providing better housing conditions for the people of the Territories in question. A great deal of training of this kind takes place in our Territories, and doubtless in others, and it deserves mention alongside more spectacular schemes of training and development.

PLANNING

D.I.J.N.O.

Wertheim, W.F., et al. (editorial committee)
THE INDONESIAN TOWN: STUDIES IN URBAN SOCIOLOGY
Volume Four in Selected Studies on Indonesian by Dutch Scholars, the Hague and Bandung: W. van Hoeve, Ltd., 1958. 379 pages. Illustrations.
301 : 711.1 (59)

1. This is a compilation of several surveys of towns and urban sociology in Java. All date from the pre-war period, and studies not initially published in Dutch are excluded. The main worth of the volume thus lies in its presentation in English of several studies of enduring value on this area. The book also contains a notable general section called "Town Planning in the Indies". We shall here concern ourselves with the general discussion, but we may note the nature of the specialized studies.

a. "Lay-Out of an Average Regency Seat" is a sketch of a typical colonial town in Indonesia, which was prepared by the geographer Th. Witkamp and commented upon by H.F. Tillema. It includes virtually every function and structure which could be expected in such a town, and it has some value for comparison with other colonial towns as well as with later Indonesian planning.

b. "The Living Conditions of Municipally Employed Coolies in Batavia in 1937" is essentially demographic study, budget (general, consumption, financial) survey and inquiry into hygienic, housing and living conditions of employees in what is now the city of Jakarta. It is amazingly comprehensive for a statistical study undertaken by a municipal government. (The survey was actually executed by the Indonesian Central Bureau of Statistics, under H.M.J. Hart.)

c. "Differential Mortality in the Town of Bandung" by W. Brand is a classic urban differential mortality study in an Indonesian setting. Important categories are the three ethnic groups: Europeans, Chinese and Indonesians. A conclusion of the study is that a decrease in differentials between ethnic groups must await social and economic improvements. However, in a 1957 postcript, the author recognizes that public health measures can reduce differentials between ethnic groups.

d. "Kuta Gede," by H.J. van Mook, is a study of "the big city" of Moslem culture on Java prior to European influence there. It is an excellent piece of historical geography and anthropology which compares the situation of this community near Jakarta before administrative regulations and afterwards. The findings are that the town needed a modern legal form.

2. All studies in this book make it quite clear that the colonial Dutch authorities concentrated on the rural scene of the islands, and blinded themselves to the problems of urban development. There was a concentration on the non-Western aspects of Indonesian life, with the process of urbanization and of town growth being treated as uninteresting and unnatural to the Indonesian scene. After 1910 the urban problems became increasingly in need of attention, and several writers called upon the authorities to recognize and deal with the evolving crisis.

Wertheim, W.F. et al. The Indonesian town --2

3. A pioneer in the application of scholarly methods to the urban problems in Indonesia, was Thomas Karsten. Karsten was a town planner, and his 1920 report to the Bandung decentralization congress was important in combining a consideration of the technological and aesthetic aspects of town planning with an analysis of colonial and urban society. Karsten also wrote many other articles on the Indonesian Town, and it was largely through his efforts that a town-planning commission was founded in 1934. Karsten was a member of the commission and was able to make his ideas and concepts felt in the work of this body. In 1938 the Town-Planning Commission submitted an explanatory memorandum to the government, accompanying a draft town-planning ordinance. The general section of The Indonesian Town, entitled "Town Development in the Indies," is simply a translation of part of a memorandum inspired by Karsten in 1938. (Karsten died in a Japanese internment camp in 1945, but his work was carried on for several years after the war by Jac. P. Thijsse.)

4. The first section of "Town Development in the Indies" is mainly statistical, showing that while less than ten per cent of Java's population was living in the 77 largest towns, the percentage was increasing. It was also shown that the largest towns were growing the fastest. Comparisons were made with the situation in India, for which better statistics were available. It was concluded that the main problem of town growth in Indonesia lay in the provision of leadership for further development.

5. The problems generated by the rapid growth of towns are treated in a separate section. These are divided into specific questions, such as buildings, roadways, traffic, various public works, and the more general problems of urbanization. The specific problems of residential buildings are treated in some detail, and the severe housing shortage affecting especially the poorer native population (but touching all classes and ethnic groups) is described. Commercial and industrial buildings are described with reference to actual and potential nuisance effects. Public buildings, including schools, office buildings, cinemas, hotels, market halls, swimming pools and religious buildings, are discussed. Special attention is given to the native religious buildings and native market facilities, which are held to be vastly inadequate. The problems of streets and traffic in a pedestrian society just invaded by the automobile are treated with remarkable insight, including the problems of sidewalks as pedestrian traffic generators and of the complications of the street vendor vs. the automobile, as this quotation will show:

> "...Instead of going to the pasar, the small-scale trader, who is usually Native, tries to find his customers in the street, either keeping on the move most of the time (with a portable 'warong', for example, or selling cigarettes or lottery tickets) or else, if he can, finding a more or less fixed spot, often at or nearby an intersection, though sometimes in front of a 'toko', which occasionally even rents out space for this purpose. In the former case it is the only way of reaching the customers

> concerned; in the latter it is usually an attempt at 'keeping pasar' outside the official pasars in order to avoid paying the fees and/or to take advantage of a better location from the point of view of sales... This question of course affects the problem of urban development only indirectly, but it is of importance nevertheless. The corrective generally resorted to is the institution of municipal 'warongs' as an attempted substitute, at least partial, for street vending. But even in case the attempt is successful, it is usually at the cost of disfiguring the urban scene with unsightly structures generally having an extensive appendage of benches, awnings, screens, and cooking utensils. Properly such 'warongs' should be located only at well-chosen and well-equipped points, preferably points set aside for the purpose in advance. The same applies to fixed stations for portable 'warongs'. Such things need to be given full consideration in drafting the street plans and neighbourhood plans. Alongside such measures, proper provisions for sufficiently decentralized 'pasars' with enough space, reasonable fees, and good locations would seem to be a precondition for combating those aspects of street vending which are indeed unacceptable for the towns, and such provisions too, must find their basis in town-planning measures. In non-Native sections of towns the decentralization may have to be carried even further than the neighbourhood 'pasar', with small, well-equipped 'warong' complexes or the like - 'third-class pasars' - to meet the need of Natives working there."

The problem of ribbon development is then discussed, and is treated with notable clarity. Recreation and sports receive special consideration. In the Indonesian situation, the problem of burial grounds had a special importance; it had also implications for public health. Other important health considerations were sanitation and refuse disposal. A final specific problem was the railroad, which, like the others, is shown to be related to town planning and to local autonomy.

6. Among the general problems, first rank is given to the problem of order and disorder in urban scenery. But beyond this are considered the questions of land rights and those of financing and the real estate offices. The problems of growing land shortages as urbanization takes place are fitted into this framework.

7. The third section of the Karsten-inspired document attempts to trace the social origins of the urban problems described. A positive attack is made on the concept-utilization of urban development as an "unpleasant phenomenon," and the process is shown to be natural and desirable but needing attention by the authorities. A careful attempt to place colonial conditions in a broader social framework is made, and to see town development as a normal period of transition.

8. Of special interest in this section is the description of native town planning. It is pointed out that in the pre-European culture, guidance and planning from above were decisive factors. Several of the large native towns were well-planned and systematically laid out: Jakarta is considered an especially good example before later bungling. Even some of the rural

settlements showed excellent planning. This evidence is felt to indicate that native society is adaptable to planning so long as such guidance is in keeping with native traditions. But tradition alone is not enough, since the urbanization of the thirties was greater than anything faced in traditional society. Yet features of traditional planning, such as north-south orientation of buildings and clustering of the community around the alun-alun (square) and its important buildings, it is felt, will contribute to useful planning for native areas.

9. The final section concludes that urban development is in fact the central problem facing Indonesia. Accordingly a need for integrated town planning is described, giving the advantages of the fusion of the internationally developed knowledge to the Indonesian situation. A key task is seen as the training of experts for the needed planning. It is noted that training in Europe and in Indonesia has been unequal to the needs. This comment, written more than twenty years ago in Indonesia, is instructive even today:

> It does not seem to been recognized betimes that the engineer working in these and related fields needs to be taught the modern yet age-old town-planning concept that questions of town development (and those of village development and regional development as well) should be seen in a larger social and administrative context, while he also needs to have more ready knowledge of details in the field of town planning than is now generally the case. This shortcoming is all the worse because even less attention is given to providing thoroughly trained, all-round 'town-planning engineers,' whose specialty must not be a specialized approach, but a comprehensive, synthesizing one.
>
> Nor have the large number of lower-level technicians coming into contact with town-planning questions in municipal and regency offices been prepared for them in any way. And civil servants and legal specialists also need to be given somewhat more basic awareness of the relationship between the technical problems and the social and administrative problems in the field of town planning."

10. The key points of "Town Planning in the Indies" are summarized as a pointing up of the existence of urban development and its continuance, and the description of a coordinated, comprehensive approach which needs not be a "social perfectionism which will squander fortunes." Planning is seen as capable of creation indispensible conditions for tolerable living within the urban society, and as a way of anticipating and accommodating problems to save fortunes for the public and the authorities.

D.K.O.W.

Dube, S.C.
INDIA'S CHANGING VILLAGES
Ithica, N.Y.: Cornell University Press, 1958. 230 pages (Photographs)
711.3 (540)

1. This is a discussion of India's village development program within its larger planning framework. Examples are drawn from Uttar Pradesh, and more specifically two villages in that state, to show the hopes and difficulties, the accomplishments and the shortcomings of villages development to date. S.C. Dube is Professor of Anthropology at the University of Saugar.

Planning for Community Development

2. In response to the many problems faced after independence in 1947, India chose the course of planned development. There had been several studies and starts toward planning, but it was not until 1951 that the first Five Year Plan was framed by the Planning Commission, published in outline and put into effect. Prior to this the Planning Commission's most valuable contributions had been unofficial fact finding. Much-discussed early plans included: the Bombay Plan, sponsored by some leading industrialists, with emphasis on individual levels of consumption of key items; the Gandhian Plan, prepared by an associate of Gandhi and emphasising the self-sufficiency of villages economies; and the Peoples' Plan, encouraged by M.N. Roy and the Indian Federation of Labour and involving large-scale nationalisation.

3. The Planning Commission, with well defined official functions since 1950, was able to set up its 1951-1956 Plan very quickly. The plan included both national and regional local projects. The plan as implemented involved the expenditure of less than 3/4 the amount indicated in the draft. Moreover, the proportions of the expenditures under the plan for different kinds of projects changed. A larger proportion than had been planned was spent on irrigation and power, transport and communications, social service, and rehabilitation. Agriculture and community development, industry, and miscellaneous projects received a lower proportion of the expenditure than had been indicated in the draft plan.

4. The basic aims of the Community Development Movement in India under the First Five Year Plan may be summarized as:

a. Immediate: To provide for a substantial increase in the country's agricultural production and for improvements in the system of communications, in rural health and hygiene, and in village education.

b. Ultimate: To initiate and direct a process of integrated culture change aimed at tranforming the social and economic life of the villages.

5. The roots of the Community Development Movement lay in the work of the U.S. Agricultural Extension Service, several British experiments, and small, unofficial rural welfare work inspired by Ghandi and Tagore. More direct antecedents were the Nilokheri Project, started by S.K. Dey in 1947; the Faridabad refugee rehabilitation scheme; and the Etawah Project, conceived by the American planner Albert Mayer. The last named was especially valuable

Dube, S.C. India's changing villages --2

as a model and as an experience in training Village Level Workers. Similarly, the Firka Development Scheme or "Rural Welfare Scheme" of Madras has been very useful.

6. In 1952 fifteen Pilot Projects were begun by the Planning Commission, and a second step was to establish fifty-five Community Development Projects--which by 1956 were to cover about one-fourth of India's rural population.

a. The Pilot Projects were started with a view to examine the suitability of the programme which the planners saw for a nationwide community development movement. The projects were in different parts of the country, and the major emphasis was on agricultural improvement and increased food production--with some attention given also to social education, rural health and public works. Each project extended to a block of about 100 villages, including about 50,000 people. Specially trained multi-purpose extension agents and social workers ("Village Level Workers") were the chief action personnel.

b. The Community Development Programme was started on a nation-wide basis before the results of the Pilot Projects were known. There was much popular enthusiasm and pressure from the states for such a move, and Point 4 aid supported these projects. Each Community Development Project was to consist of three blocks of 100 villages each, or a total in area of up to 500 square miles and in population of up to 300,000 people. The Community Development Projects were more comprehensive than the Pilot Projects, offering a co-ordinated programme of many-sided rural development. The resources of these projects has resources of fifteen times those of the Pilot Projects, which only one-third the size. Besides offering agricultural extension, balanced programmes of villages sanitation and public health, education and youth welfare, irrigation and public works and women's welfare were presented. Administrative innovations were introduced for smooth functionning of these projects. Under the first Five Year Plan, the Community Development Programme and its later parallel National Extension Service influenced the lives of 74 million village people.

7. The programme and methods of both the intensive Community Projects and the more general National Extension Service type projects consist of five stages: conception, initiation, operation, consolidation and finalization. The projects take three years, divided in the following time periods according to the above phases: 3 months, 6 months, 18 months, 6 months, and 3 months. The areas covered by the intensive Community Development Projects are the following:

a. Agriculture: Reclamation of available virgin and waste land; provision of water for agriculture through irrigation canals, tube wells, surface wells, tanks and life irrigation from rivers, lakes and pools; development of rural electrification;

provision of commercial fertilizers; provision of quality seeds; promotion and utilization of improved agricultural techniques; provision of veterinary aid; provision of technical information through slides, films, radio broadcasts and lectures; provision of improved agricultural implements; promotion of marketing and credit facilities; provision of breeding centres for animal husbandry; development of inland fisheries; promotion of home economics; development of fruit and vegetable cultivation; provision of soil surveys and information; encouragement of the use of natural and compost manures; and provision for aboriculture and reafforestation.

b. Communications: Provision of roads; encouragement of mechanical road transport; and development of animal transport.

c. Education: Provision of compulsory and free education, preferably of the basic type, at the elementary stage; provision of high and middle schools; provision of adult education and library services.

d. Health: Provision of sanitation (including drainage and disposal of wastes) and public health measures; provision for control of malaria and other diseases; provision of improved drinking water supplies; provision of medical aid for the sick; pre-natal care and mid-wife service; and provision of generalized public health service and education.

e. Training: Refresher courses for improving the standard of work of existing artisans; training of agriculturists, extension assistants, additional artisans, and of supervisors, managerial personnel, health workers and executive officers for projects.

f. Social Welfare: Organization of community entertainment; provision of audio-visual aid for instruction and recreation; organization of sports activities, melas (village fairs), and of co-operatives and self-help movements.

g. Supplementary Employment: Encouragement of cottage industries and crafts as main or subsidiary occupations; encouragement of medium and small-scale industries to employ surplus labour for local needs and to provide products for outside project areas; encouragement of employment through trade auxiliary and welfare services; construction of brick kilns and saw mills to provide building materials for local needs.

h. Housing: Demonstration and training in improved techniques and designs for rural housing; encouragement of improved rural housing on a self-help basis.

8. In studying a rural development project in action, it was found that the implementation of the project during the first 18 months deviated considerably from some of the early, initial targets. Part of this was due to the acceptance or rejection of certain innovations--because of human factors linked to the process of externally induced change.

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9. In his analysis of response of the villagers to change brought by the Community Development Programme, the author points out that while the ideal of the project was to work for the many-sided development of the entire community, the results in the village studied were somewhat at variance with this aim. Nearly 70% of the agricultural benefits went to the elite group and to the more affluent and influential agriculturists. A reason for the smaller gains of the poorer agriculturists is seen in their greater suspicion of government officials and their lesser ability to reciprocate on a personal level with the Village Level Worker. Significant steps were taken in sanitation and public health, but these were felt to reach only slightly below the surface of the problem and to do very little to change the outlook of the people towards nutrition, hygiene and health. Social education was especially neglected, being treated more or less as a formal requirement, with no understanding of its basic aims.

10. Several kinds of motivation were observed in the villagers' response to change. Economic advantage and convenience brought acceptance of some new seeds and improved implements and of hand pumps and chaff-cutters. The prestige of the individual, family, kin-group, caste and village was another important way to reach the villagers. Adoption of 'progressive' ideas, the ownership of a tractor, the construction of new wells in a caste-segregated areas of a village, the building of a village school or other public buildings or street pavement. Individual and group competition was an important source of motivation. The novelty of innovations and the resulting curiosity was behind the trying of some new agricultural implements and improved techniques, but others were rejected as too strange. A final kind of motivation was compliance to the wishes of government and of village leaders. The national government is highly respected by the villagers. The influence of certain local leaders was also important on some projects, securing acceptance by a considerable section of the villagers.

11. The main obstacles to greater acceptance of the programmes were the following:

-General apathy of a considerable part of the village population;

-Suspicion and distrust of officials and outsiders;

-Failure of the Project to evolve effective and adequate media of communication;

-Tradition and cultural factors.

12. The role and function of state officials as agents of change are analysed in some detail. Important administrative innovations have been made to accommodate the Community Development Program. Yet there is room for more project autonomy on many matters. And the administration still has to find its place in Indian government: the evolution from bureaucracy to an active social service role is said to be going on, with some danger of the administrator viewing his role as simply political. There is more need for fair evaluation of the village

projects--including not only the visible, physical, official sides of projects, but also the underlying evolution of change.

13. Problems of communication ("who says what to whom, how, with what effects") in the Community Development Projects are brought about by factors of content and of intermediate communication factors. Cultural predisposition, cultural screens and processes of cultural adaptation in the community to which the message is addressed govern the factors, the process and the results of communication. Some of the themes the Village Level Worker tried to put across to the villagers were better received than others. Moreover, an innovation is rarely accepted by the community in its originally presented form; rather it goes through a series of cultural screens at the elite level, the informal groups and factions, the leaders of caste and kin groups. All groups supported the construction of new wells, but none of them accepted the Village Level Worker's reasons for improved sanitation. Similarly, an innovation like the shamdan ('voluntary road building drives') is accepted by different groups in the village for different reasons, almost always at variance to the stated democratic purposes. The actual work is done by groups with low status and income who can least afford to give up a day's wages.

14. Innovations are invariably adapted to the contemporary cultural norms and patterns. The government's revival of the panchayats was motivated mainly by a desire to create a machinery of village self-government, working along the lines of the legendary panchayats in which the democratic consensus of village people decided all issues on the basis of village norms, caste norms and a few well remembered precedents. Actually, such attention by the government stimulated a power struggle in the village.

15. The most successful kind of communication in community development was that which used the idiom, symbols, language and channels of communication already present in the village. The problems of communication in rural community development are those of adapting the agents of change, the media of communication and the form and content of communication to the culture, value system, attitudes, and world of the community.

16. The cultural factors which influence community development programmes most may be classified as habits and taste, social practices and tradition, the belief area, the social structure, attitudes and values, etc. In planning for community development, the primary effects of an innovation cannot be the only consideration: secondary and tertiary effects may be even more important in the long-run. For example, the introduction of a new seed grain may disrupt household as well as agricultural routines--and even domestic relations.

17. Selectivity and differential acceptance of changes need attention, as does the reinterpretation of innovations in terms of dominant cultural themes in a village. Education is valued by upper caste peoples as a mean of maintaining their position, but it is valued by the untouchables as a means of breading down the same ascriptive status structure.

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In education, the community development specialist must try to see the innovations in all their reaches into the total cultural setting; if there is lack of fit, the programme may not be accepted. A balanced and critical evaluation of the motivations and mechanisms of change in these societies, together with the analysis of the cultural determinants of acceptance and rejection, can provide fruitful insights toward better planning and execution of development programmes.

18. The Indian community development programme is an impressive and pionnering venture which has excited interest throughout the world. It may have an influence on the course of development in other underdeveloped areas. But only an experimental beginning has been made: there are only faint signs that the Indian masses are stimulated to autonomous development. Its planners cannot afford to be self-complacent or slow in pushing their efforts. There are many pitfalls ahead for this programme, but through critical self-evaluation and innovation the planners can make the programmes more effective.

D.G.I.O.

Guerin, Etienne J.
VALLINGBY
Architecture and Building, December 1958, pp. 444-464. Illustrations.
711.4 (485)

1. Vällingby, near Stockholm, is one of the most interesting of planning developments to take place during the past few years. EKISTICS will want to comment on various aspects of this plan during the coming issues, but we may begin with this general discussion which was recently published.

2. The growth of Greater Stockholm is one of the striking examples of rapid urbanization of our era. The city and its surroundings now include more than a million of Sweden's 7.5 million inhabitants. It is recognized that the growth is likely to continue, and Sven Markelius of the City Planning Commission led that body in considering what form the expansion could take.

4. Markelius was in favor of a complete town section, a microcosm of the city, as a sounder principle than the usual dormitory suburb. It was recognized that many of the residents would commute to the centre of Stockholm for work, but Markelius insisted that commercial and industrial units should be included in the new development.* Employment to be provided by these activities was set at 25 percent of the resident population. A shopping center and amusement core would cater not only to local residents but also to those in a wide surrounding area. The aim of such integrated development was to relieve the pressure on inner Stockholm by building up a secondary community within the city, rather than dispersing the population to new dormitory housing estates on the periphery or by creating a fully independent new town some distance away from the metropolis.

4. Vällingby is nine miles from central Stockholm and consists of four square miles of farmland owned by the city since 1930. It was planned for a population of 23,000 inhabitants, but it was to serve an additional 60,000 people grouped in surrounding developments.

5. There are four main suburban groups in the new structure of Greater Stockholm, Vällingby being the best known. The division of the whole city into groups of communities of such a size that they can conveniently form the basis for main centres is the core of Markelius' plan. By decentralization of various activities, the plan aims at balance within limited units between working place and residential quarters. The redevelopment of the inner metropolitan area is also planned on this basis: a single unit is formed by the central working district, together with the residential area of the inner city and the nearest suburbs to the west and south.

6. The planning design and realization of Vällingby speak well for Stockholm's land ownership, imagination and enterprise. Major decisions have been good ones: preservation and exploitation of a fine landscape; free planning; maximum open space; segregation of pedestrian and vehicular

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*EDITORS' NOTE: As will be developed in later articles on Vällingby, the key to the plan is the relation of the center to the end of a subway line. Guerin has missed this point.

Architecture and Building, December 1958.

General view of Vallingby from the air

Architecture and Building, December 1958.

MASTER PLAN OF VALLINGBY

Architecture and Building, December 1958.

Section through shopping centre

General view

traffic; integrated rail transport; car parking and pedestrian shopping; complete cultural and entertainment facilities; a great variety of housing types; a single central plant for heating and power. The basic concept of the architecture is fine and it is exhilerating in realization. It is an important experiment in character and in size.

7. A measure of the success of Vällingby's center is the extent to which the shopping habits of the suburban communities have been altered since shops and amusements were provided in Vällingby. The number of families using Vällingby's center is growing rapidly, and the change seems permanent. At the same time, the sucess of the centre has made merchants hesitant to locate in other parts of the suburban complex. There is one cinema in Vallingby centre at present, but the theatre has not yet been financed.

8. Two churches have been built near to the centre. First was a small church by P. Carl Nyren, and more recently a new church by Peter Celsing is being built. Several areas around the centre have been reserved: offices are projected, and a Lyceum to Helge Zimdahl's design will be located nearby. Two large garages offering multi-level parking are planned. Also, discussion has begun about a hotel for the centre, which would serve salesmen visiting offices in the area. Industrial development in Vällingby has been slow, with strong opposition to location there expressed by the labour interests. Those industries which have come to Vällingby are highly specialized, such as IBM Arenco.

9. Vällingby itself is scheduled to house exactly 23,000 persons, including about 7,500 dwellings at a cost of 500 million kr* Streets, sewers, public utilities amounted to 50 million Kr., and the subway cost 50 million Kr. The dwellings cost 275 million Kr.; the industrial development area cost 100 million Kr. Schools cost 35 million Kr. and a sports gynmasium was about 5 million. This makes a total of about 500 million Kr.

10. Among the important buildings in Vällingby are the subway building by Magnus Ahlgren and the shopping centre, the public health buildings, the assembly halls and the cinema--all by Sven Backstrom and Leif Reinus. A school by Helge Zimdahl and the church by Carl Nyren are also notable. One garage and a group medical centre, both by Gustaf Birch-Lingren and Rudolf Holmgren are also worthy of attention.

11. The variety of housing types is considerable. Twelve-storey flats have been designed by Hjalmar Klemming, who has also designed point blocks and some prefabricated flats. Round blocks were the work of Gunnar Jacobsson, and tower blocks were by Stig Ancker, Bengt Gate and Sten Lindgren. Stepped blocks were worked out by Jon Höjer and Sture Ljungquist, who also designed terraced houses. Paul Hedquist developed two kinds of point blocks, as well as maisonette blocks and terrace blocks. Another kind of tower was designed by Jarl Bjuström.

*100 Kr. = US $19.00

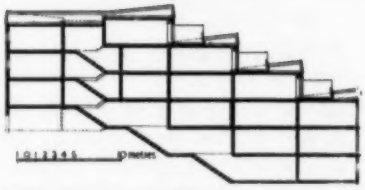
Architecture and Building, December 1958.

Above: general view of stepped blocks. Left: one block

STEPPED BLOCKS

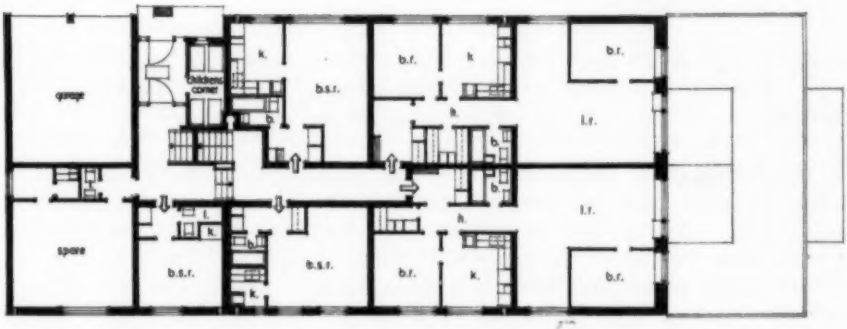
JON HÖJER AND
STURE LJUNGQUIST

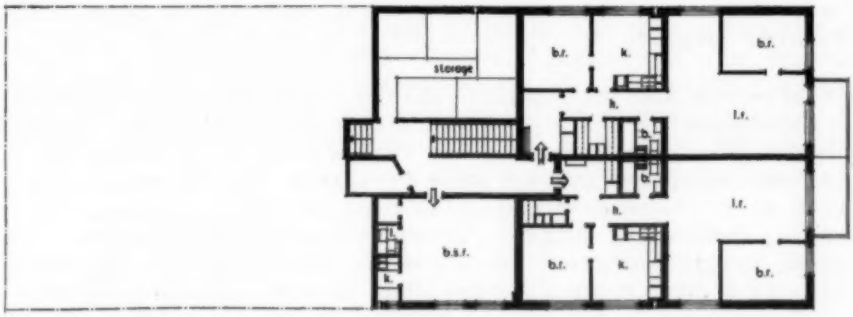
THIS block of flats makes use of a sloping site to provide a variety of dwellings, from three-bedroom flats to single bedsitting room. The main entrance is from the side at fourth floor level, and to each floor below by a staircase following the slope at the spine of the building. All the larger flats have wide balconies over the stepped flat below.



Section through stepped block

Below: floor plans at two different levels





D.K.O.

United Nations, Technical Assistance Programme
COMPREHENSIVE DEVELOPMENT OF THE LOWER MEKONG RIVER BASIN
Report of the United Nations Survey Mission, TAA/AFE/3, 22 April 1958.
711.2 (59)

1. The Report of the Survey Mission for the Lower Mekong development has been refered to earlier in discussing this important international multi-purpose river valley development. (See HIB-GA 30, p. 149; and HIB-GA 36, pp. 120-121.) We shall now cover only the points brought out by the report itself, and the reader may wish to refer to the earlier articles for background information.

2. The lower Mekong River flows through Laos, Thailand, Cambodia and Viet-Nam, and is felt to have great potential for service to the riparian countries in the following fields:

a. Navigation

b. Hydro-electric power generation

c. Irrigation

d. Other related water uses.

It is a snow-fed river and thus has a perennial flow. The possible hydro-power sites are easily accessible and are located within reasonable distance of potential load centres. The topography of the basin appears to be suitable for diversion of the river flow for irrigation of large tracts of land. The control of flods and improvement of drainage can be reasonably accomplished--usually in combination with works for the above purposes. The river seems capable of ranking with Southeast Asia's greatest natural resources.

3. A major handicap in working out river programmes in under-developed areas is the lack of adequate and reliable data, and the report sets down some of the kinds of data which will have to be collected:

a. A comprehensive programme for the collection of hydrologic, meteorologic and geologic data and for surveys and mapping is outlined. Equipment and stations required to implement this programme are also given. The comprehensive plan for the basin must consider possible development in the upper basin of the Mekong and tributaries over a long period. But it is noted that more than 75 percent of the land area of the Mekong basin is in the lower part, where the bulk of the population is also located.

b. Related and special studies necessary for the preparation of a comprehensive basin plan are similarly dealt with. For the development of resources other than water, it is necessary to have extensive surveys made to assess the raw materials, such as iron and other metallic ores, bauxite, gypsum, phosphate, rock-salt, suitable fibres for paper manufacture, and other forest products. Thus the collection of all the basic data is a long-range undertaking. To meet the more urgent

needs of an under-developed area, it may not be possible or desirable to wait for the preparation of an ultimate comprehensive basin plan. For the present situation, it is first necessary to determine the more urgent needs and then to suggest a few selected projects for earlier detailed investigation to meet the needs.

4. A few reaches on the main river which appeared to offer possibilities for early development were selected. High priority was given to the collection of engineering data on these reaches; and as soon as the essential facts are known, preliminary planning of development should begin. The planning would involve study of various alternative plans feasible for multi-purpose development.

5. A relatively high dam creating a large capacity reservoir, for example, can contribute appreciably to the regulation of the river flow, thus increasing the firm power output of the project at that site as well as of all downstream projects. The reservoir would reduce the flood peak to some extent, submerge the rapids on the upstream side and increase the downstream draft during the dry season. These advantages would have to be weighed against those of the alternative proposal, which involves a series of low dams which would not submerge excessive lands and villages and would involve the construction of a relatively low head and less expensive locks for passing vessels. Various layouts will have to be considered to compare the costs involved and benefits derived therefrom, as well as to view the relative importance of power, navigation, irrigation and other purposes to the nations concerned.

6. Definite project plans and designs, along with detailed cost estimates, will have to await the selection from among the various feasible alternatives. The mission's report, therefore, has treated all apparently feasible projects on the main river as having first priority and those on the tributaries has having second priority. The related and special studies on the main river also been given high priority.

7. The related and special studies should include fisheries, agriculture (irrigation, flood control and drainage), forestry, mineral resources, transportation (waterways, highways, railways and airways), power market, and general economic studies.

8. Careful consideration was given to the proper phasing of various kinds of investigations and studies. The schedule of work-phasing covering five years is prepared under the assumption that resources for its implementation are available from external sources. The annual expenditures required, from the first year onward, are about:

$2.5 million
$1.8 million
$2.2 million
$1.7 million
$1.0 million

Expenditure in the first three years, amounting to about $6.5 million is for the collection of basic data and for studies and investigations relating to the development of the most promising reaches of the main river. Expenditure in the fourth and fifth years, $2.7 million, is for investigation and planning of other reaches of the river and major tributaries.

9. Difficulties in implementation will stem from a shortage of technical personnel, agencies and equipment available. It is felt that many of the projects should be entrusted to national agencies of the four countries, but that such work would tax such agencies overly. Thus, in the interest of early achievement of the project, it is felt that outside aid will be necessary in all of these resource categories. Specialists from every field will be needed.

O.P.W

United Nations, Economic and Social Council
INFORMATION CONCERNING THE SPECIAL FUND FOR DEVELOPMENT
E/CN.14/L.1, 1 December 1958.
333 (100)

1. This is a discussion of the Special Fund established by the General Assembly of the United Nations in October 1958. The purpose of the Fund will be to provide systematic and sustained assistance in the fields essential to the integrated technical, economic and social development of the less developed countries. The Special Fund started operations on 1 January 1959, and details of organization and procedure are still to be settled. Given here information on the background and aims of the Fund.

2. The employment of international machinery to promote the economic and social advancement of the less developed countries has been a major concern of the General Assembly and the Economic and Social Council of the United Nations. Two main preoccupations were behind the General Assembly's decision to create the Special Fund:

a. The growing recognition that the Expanded Programme of Technical Assistance had encountered a number of limitations due to the character of its operations and to the basic legislation governing the Programme. In particular, the Programme was unable to finance a whole range of valuable projects involving commitments of relatively large resources over a number of years or requiring a substantial percentage of aid for equipment.

b. The General Assembly, the Economic and Social Council and various groups of experts had been studying since 1951 a proposal for the establishment of a Special United Nations Fund for Economic Development which, by means of grants-in-aid and low-interest, long-term loans would have assisted in financing such non-self-liquidating projects basic to the economic development of the less developed countries as are normally not eligible for financing by existing international financial institutions. This was supported in principle, but a number of governments felt that sufficient funds were not available to make the project work. Other countries, however, insisted that the fund be established--at once--at least on a small scale.

3. Several proposals and counter-proposals were made during 1957, and the General Assembly discussed two proposals especially. The General Assembly technical assistance and development activities of the United Nations and the specialized agencies. It was believed that the resources prospectively available at the time for the two programmes were not likely to exceed $100 million annually, and the Assembly agreed that the operations of the Special Fund would be directed towards enlarging the scope of the United Nations programmes of technical assistance so as to include special projects in certain basic fields. Included, for example, would be intensive surveys of water, mineral and potential power resources, the establishment (including staffing and equipping) of training institutes in public

administration, statistics and technology, and of agricultural and industrial research and productivity centres.

4. The General Assembly further decided that, as and when the resources prospectively available were considered by the Assembly to be sufficient to enter the field of capital development (principally the development of the economic and social infrastructure of the less developed countries) the Assembly would review the scope and future activities of the Special Fund and take such action as it might consider appropriate.

5. The General Assembly established a Preparatory Committee to make recommendations regarding the structure and operations of the proposed Fund. The Committee's Report and Recommendations were endorsed by the Economic and Social Council and forwarded to the General Assembly, where the Special Fund was formally established on the bases of the Committee's recommendations.

6. Quoted here is Item I, Part B of the text of the General Assembly resolution establishing the Special Fund; it is entitled "Basic fields of assistance and types of projects."

> The Special Fund shall assist projects in the fields of resources, including the assessment and development of manpower, industry, including handicrafts and cottage industries, agriculture, transport and communications, building and housing, health, education, statistics and public administration.
> In view of the resources prospectively available at the time of the initial period of the Special Fund's operations, projects to be assisted by the Special Fund might be in one or a combination of the following forms: surveys; research and training; demonstration, including pilot projects. These may be implemented by the provision of staff, experts, equipment, supplies and services, as well as the establishment of institutes, demonstration centres, plants or works, and other appropriate means, including fellowships, in so far as they are integral parts of a specific project financed by the Special Fund, in such proportions as are judged necessary by the Managing Director for each project, taking into account the type of assistance requested by Governments.

7. Regarding the extent of the financial operations of the Special Fund, we quote another part of the resolution (Part B, I, 1, c):

> In view of the resources prospectively available at this time, which are not likely to exceed $100 million annually, (the fund should) direct its operations towards enlarging the scope of the United Nations programmed of technical assistance so as to include special projects in certain fields (as in above quotation). The Special Fund is thus envisaged as a constructive advance in United Nations assistance to the less developed countries which should be of immediate significance in accelerating their economic development by inter alia, facilitating new capital investments of all types by creating conditions which would make such investments either feasible or more effective.

CONSTRUCTION

A.E.F.N.S.

Webb, T.L. and van Aardt, J.H.P.
DETERIORATION OF MATERIALS UNDER TROPICAL CONDITIONS
Symposium on Design for Tropical Living, Durban, South Africa, 1957.
Illustrations.
620.19 (213)

1. This paper presents an account of the significance of climatic factors on the deterioration of timber, bituminous materials, paints, concrete and cement products, metals, ceramic materials, plastics and building stones. Reference is made to the importance of research already done in this field. The modes of deterioration, the investigation of the processes by which it proceeds, and the most appropriate action in terms of selection, application and protection of such materials for longer useful life are reviewed and discussed.

2. The deterioration of building materials in tropical climates is often more serious than, and generally different in form from in temperate climates. The main deteriorative influences in tropical climates are high temperature, moisture, high humidity, solar radiation, insects and micro-organisms, and (in coastal areas) the effects of salt. Some of these factors are interrelated, and deterioration is not usually due to a single factor.

3. Tropical zones are those lying between about $23\frac{1}{2}^{o}$ north and $23\frac{1}{2}^{o}$ south of the equator. Because of the extreme importance of a marine environment as a factor in deterioration of building materials, the broadly defined regions of the tropics are subdivided into coastal and inland zones.

4. Deterioration is essentially a process of physical and chemical change, an integral and inevitable result of the operation of natural laws which cannot themselves be changed. The speed of most chemical processes is about doubled for each $10^{o}C$ rise in temperature, and moisture generally accelerates such processes--which proceed very slowly if at all in dry conditions. Also, moisture frequently transports aggressive media and accelerates or makes possible biological attack. Most biological processes proceed at a maximum rate at some optimum temperature, above or below which speed is reduced. Moisture and repeated change thereof causes important physical changes in many materials.

5. Solar radiation accelerates many chemical changes, especially if the radiation is in the high energy short wave solar spectrum. Where salt is present, it is an important factor contributing to metallic corrosion to the disintegration of ceramic products, and to some biological processes. It is to be noted that areas of the tropics which are arid, such as the Sahara, are not generally agressive to building materials and are in fact known for the extreme durability of some materials.

Organic Building Materials

6. Timber, bitumen and thatch have been used all through human construction, while the use of synthetic organic resins and plastics is relatively new. Organic substance are subject to attack by fungal and bacteriological agents and by chemical changes under certain conditions.

Webb, T.L. and van Aardt, J.H.P. Deterioration of materials... --2

7. Timber. The principle causes of deterioration of timber are attack by wood-destroying fungi, insects and borers. The natural resistance of some timbers has been investigated but relatively little is known of many indigenous timbers. In order to attack timber, both fungi and insects need favourable conditions of moisture, temperature, air and also suitable food, which is wood itself.

8. Merulinius Lacrymans, the true dry-rot fungus, is the most virulent species found on timber inside buildings. It occurs in damp, ill-ventilated positions and spreads by means of white or grey strings of tissue, sometimes of pencil thickness, which carry water and are capable of existing in brickwork or under plaster over some distance. Established, the fungus can partly maintain its own moisture requirements by decomposition of wood. Fungi grow more rapidly under warm conditions, twice as fast at 30°C than at 20°C--though the optimum varies from species to species. Moisture contents from 35% to 50% are most favourable for the growth of wood-rotting fungi, but some grow at still higher moistures. Heavy financial loss is due to fungal attack in the tropics.

9. Wood borers and termites are even more important than fungi in deteriorating wood in the tropics. The methods of preventing attack by termites involve eradication of termite galleries, good drainage arrangements, the poisoning of soil and (where suspended floors are used) good sub-floor ventilation. Timber should be treated, preferably by pressure impregnation, in accordance with a suitable specification.

10. Quite distinct from decay by fungi and destruction by borers and termites is the weathering of wood under the influence of the elements. This is the mechanical and chemical disintegration of the surface of the wood, caused by alternate shrinking and swelling under different weather conditions and under the action of sunlight. Such deterioration is severe under tropical conditions.

11. The durability of plywood and other manufactured wood products depends not only on the resistance to decomposition of the wood substance itself but also on the durability of the glue used. Animal and vegetable glues are vulnerable to decomposition by moulds and bacteria, but the synthetic resin glues are much more resistant. Deterioration may be rapid if the glues are not moisture-resistant. Processed timber products such as hardboard generally give good service, but warping and surface weathering are dangers unless the surface is protected by paint or a similar covering. Thatch roofs have only a limited life under tropical conditions and are a fire hazard. (It is noted that painting or surface-coating alone cannot be relied upon to preserve wood.)

12. Protective Coatings. Paints decorate and protect the underlying material. Paints break down much more rapidly in the tropics, the most important factors being solar radiation and moisture. The performance of paints based on alkyd resins is superior to conventional

oil paints. White paints fail more rapidly than dark paints, but paints with aluminium pigment are excellent in performance. For timber, however treatment by creosote may be more effective and less costly than paint. Also, non-ferrous metallic coatings may be superior to paints on steel. However, paints remain important; and more durable paints have recently been developed for roofs. Paint films on galvanised steel in marine tropical environments deteriorate much more rapidly, and they must receive special attention.

13. Bituminous products. These are particularly affected by warm, humid climates: in the presence of moisture, oxygen and ultra-violet light, the material becomes brittle with resultant cracking and disintegration. If bitumen is used with organic materials as fillers or if organic fibres are impregnated with bitumen, the deterioration of the composite material can be rapid because of biological decay. Bituminous roofings deteriorate fairly rapidly in the tropics. Direct sunlight has an obvious effect on exposed roofing and unless the coating is periodically renewed, moisture will reach the felt base. The base will then deteriorate due to physical, chemical and bacteriological actions. Where asbestos or other mineral fibres form the matrix of bituminous roofing sheets, the bacteriological action is insignificant; the use of such materials in hot climates is therefore to be encouraged.

14. Plastics. Synthetic resins and plastics are now being used extensively in building construction. Generally the same factors which influence paint films apply to these organic materials--though perhaps to a lesser degree since their thickness is greater and surface defects are less important. When thermo-plastics are used, their temperature susceptibility is important. Thermal expansion in plastics is usually greater than that of metals, and their use in structrues must consider the deterioration which can result from such expansion and shrinking. Not much is yet known about the weather resistance of plastic materials over long periods of time. Some plastics, however, are known to become brittle and disintegrate on prolonged exposure to the weather, and loss of transparancy or gloss as well as color change are not uncommon. Ultra-violet light may damage light colored plastics. Reports from Australia are that termites may attack polyethylene piping, especially where the surface is rough. Phenolic plastics have been found to give poor performance in tropical conditions. Studies have also shown that mould growth can take place on plastics, but that few plastics support such growth. At the same time, wood flour or tectile fillers have been known to provide food for moulds.

Inorganic Building Materials

15. Although inorganic materials are commonly regarded as being less susceptible to deterioration, similar factors influencing deterioration under tropical conditions apply to these materials. The consequences are frequently serious.

16. Concrete. The deterioration of concrete and concrete structures must be considered from the following points of view: Corrosion of reinforcing steel, biochemical processes, aggressive chemicals and soft waters.

17. Corrosion of reinforcing steel in concrete is probably more severe in coastal tropical conditions. Since the corrosion of steel involves the formation of voluminous oxidation products, the consequences is that pressures develop within the concrete resulting in its disintegration, in the exposure of the steel with further corrosion, and ultimately the failure of the structure. The phenomenon of marine corrosion is a problem which can be effectively reduced and largely overcome by attention to the location of the structure, its design, the use of good quality concrete and materials, the application of surface coatings to the concrete and other measures.

18. Biochemical attack on concrete used for certain purposes, such as sewers, is a considerable problem in tropical regions. Sewers are corroded through hydrogen sulphide (which is produced in the sewage from sulphur compounds by sulphur-reducing organisms) being converted on the walls and the roof of the sewer to sulphuric acid by sulphur-oxidising bacteria. The acid attacks any constituents of the structures which are vulnerable to acid and/or sulphate. Concrete and other hydraulic cement products are seriously attacked in sewers. The dependence of this phenomenon on temperature is well shown by the decrease of such action during the winter. Research indicates that the problem can be reduced substantially by careful sewer design and the use of calcareous aggregates where concrete is used, or the use of an alternate acid-resistant ware. The action of sulphate-reducing bacteria and autotropic sulphur-oxidising bacteria is found outside sewers. The autotropic bacteria and moulds use inorganic salts and carbon dioxide from the air or carbon from carbonates for their growth; they require no organic substances. Many building materials containing sulphates can also be affected in this way under some conditions.

19. Many micro-organisms growing on organic materials in contact with building materials produce acids and other chemical substances which attack the structure. For example, the fermentation of milk and other food products in contact with concrete floors and walls can prove very serious in warm, humid climates. Warmth, moisture, food and sometimes light are needed for optimum growth of bacteria and moulds.

20. Sulphates, often present in soils and in waters in contact with concrete, and other aggressive substances such as some chlorides, soft waters, sugars, (when fermented), and vegetable oils, attack cement products. Since these are chemical reactions, the severity of such attack is considerably increased by rise in temperature. Reduction of such attack is a complex matter and each case should be carefully examined; attention to design, concrete quality, type of cement, curing, use of protective coatings and other factors can help considerably. Soft waters are quite a serious mode of deterioration of concrete in temperate as well as tropical areas. Good quality of concrete is the only means known so far in combatting this sort of deterioration.

21. Cement. The deterioration of cement in storage under warm humid conditions presents difficulties in such storage. The setting and hardening of hydraulic cements involve chemical reactions which are influenced by external conditions. When hydraulic cements harden, heat is evolved, the temperature rise being determined by the conditions and temperature of the environment. Some types of cements have a high heat of hydration, which can lead to considerable temperature in mass concrete: on subsequent cooling shrinkage cracking will follow.

22. Low-heat cements should preferably be used for large masses of concrete in the tropics; and precautions should be taken to dissipate the heat of hydration. When high alumina cement is used, a rise in temperatures above 25°C should be avoided, for this cement liberates much heat on hydration and it is advisable to use cold or iced mixing water and to keep the products cool during the first day by curing with excess water. For this cement the hydration products formed at low and high temperatures differ; the high temperature hydrates are inferior and are more vulnerable to chemical attack (e.g. sulphur corrosion). Hardened high alumina cement deteriorates when used in hot damp conditions.

23. Ceramic and Glass Products and Natural Building Stones. Materials of this sort are susceptible to deterioration, especially if they are of poor quality. The most common cause of deterioration of bricks and tiles is efflorescence. There are two types of efflorescence: one in which quite extensive white deposits of salts occur on the surface of bricks and another destructive form ("crypto-efflorescence") in which such salts crystallize below the surface of bricks, bringing about their disintegration. Crypto-efflorescents is likely to be more common in tropical regions where periodic changes of temperature of 32°C take place. A special case of efflorescence damage is that found in stone facings due to sulphates entering them from the structures. Lactascence or white staining is often found in the tropics and sometimes confused with efflorescence. This staining of the masonry is due to the deposition of calcium carbonate originating from the mortar. Some ceramic products deteriorate through the rehydration of clay materials, as has been reported from Australia.

24. Glass is known to deteriorate more rapidly in humid tropical climates than in temperate conditions. Glass mosaics have been shown to deteriorate in the tropics. A test is available to test the susceptibility of glass to this type of failure. Building stones may deteriorate under high temperatures.

25. Metallic Corrosion. The controlling factor in atmospheric corrosion is the relative humidity: the corrosion of metals becomes serious at relative humidities above 70-80 per cent. Combined with high temperatures and salt in the coastal areas, metallic corrosion is especially bad in the marine tropics. Steel is the main problem, because of its wide use; but zinc, lead, aluminium and even stainless steel are also important. Galvanized roofs, galvanized steel surfaces, as well as the corrosion of lead in building have been investigated. Good aluminium, properly used, can be very durable in tropical conditions.

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26. Laminar corrosion in a wall member of an aluminium house may be due to the unsuitability of high strength copper containing aluminium alloys for such uses. Other important factors influencing rate of corrosion of aluminium are rainfall, temperature, atmospheric pollution and exposure. Salt spray increases corrosion on the cost. Lost of weight in exposed aluminium has been reported as three times as high in tropical conditions. The susceptibility of aluminium to attack by alkaline materials such as plasters or mortars, leads to serious corrosion. The main causes of deterioration in buildings are contact between dissimilar metals, improper painting or maintenance or bad design.

27. A typical example of corrosion of a steel pipe due to soft water finds, in addition to the destruction of the metal, the reduction in effective internal diameter by nearly two-thirds due to the accumulation of corrosive products. Since, for a soft water of a certain degree of aggressiveness, the rate of corrosion increases with temperature, problems of this nature are more serious in hot climates.

28. A further case of metal corrosion which is particularly significant in tropical climates is that due to bacterial action. Certain organisms, present in soil, can produce chemical substances which cause serious corrosion. An example is the corrosion of steel under conditions favourable to the growth of sulphate-reducing bacteria.

29. When considering action to reduce corrosion of metals in buildings, it must be remembered that the matter needs attention during the design stage. Competent advice should be sought on these complex problems, for irreparable damage can occur. On the other hand, much can be done during the production stage. Finally, much of metal protection can be achieved after installation. In practice it is found that it is more economic to deal with metal protection in the early planning stages.

Discussion at the Symposium:

Mr. E. Leighton Black:

May I ask a question about sulphur dioxide and other sulphur compounds in smoke, and about the effects of humidity on atmospheric sulphur dioxide? Can this cause damage to buildings? I would also like to mention an old wive's tale which has considerable currency and this is that efflorescence in brickwork can be treated by applying cheap vinegar.

Mr. G. Hamilton. (Director, Paint Industries Research Institute);

What I have to say can be considered as supplementary to Mr. Webb's paper rather than questions concerning it. I have been surprised that no mention in the papers to be presented has been made of the question of the psychological effects of colour on comfort, but perhaps this matter may be mentioned at the appropriate place in the discussions.

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Mr. T.G. Layton. (For Regional Representaitve, National Housing Office, Durban):

Can Mr. Webb please advise us of what steps it is possible to take to arrest corrosion on steelwork in reinforcement and steel fixtures, once corrosion has commenced, and do the authors of this paper think that the poisoning of soil against termites is a permanent measure?

Mr. C.R. Fridjhon.

I would also like to make an observation about the treatment of laps in corrugated iron roofs, where it appears that if the laps are not painted before fixing, corrosion appears to be more rapid at the laps.

Mr. T.L. Webb (replying for the authors):

Sulphur dioxide. The answer to this question is that if sulphur dioxide in the atmosphere can be oxidised, turning in into sulphur trioxide which in the presence of water forms sulphuric acid, it will give rise to an aggressive component which will attack buildings.

Vinegar for efflorescence. It is true that vinegar as a specific for efflorescence troubles has come to be widely accepted. However we have to differentiate between the various causes of efflorescence. Vinegar would be effective against the type of lactescence caused by a surface film of calcium bicarbonate, but not against true efflorescence. But why use vinegar? It would be more suitable to use dilute hydrochloric acid to clean down brickwork marred by lactescence.

Corrosion. Again the really important thing is to take proper action at the design stage; a little trouble taken at that stage is far more effective than any amount of subsequent action. If necessary a competant authority on corrosion should be consulted. As to methods of reducing the rate of corrosion once it has started, there are manuals on the subject. Most of the methods and procedures available are expensive, and it is far cheaper to anticipate trouble by proper specifications and supervision.

Dr. S. Biesheuvel. (replying):

Colour. Colour is important in regard to adjustments in a tropical climate, as it is in any climate. It is used in the treatment of serious mental cases; blue has been found to have a sedative effect, and is looked upon as a "cool" colour. However the reflective characteristics of the lighter colours are probably more important than any intrinsic effect on the psyche, and in a hot climate light colours are better, because of their reflection factors. The intense warm colours often associated with the tropics are probably related to the myth of the gay life which is alleged to go with the tropics, rather than to any inherent suitability which they may possess.

D.E.G.S.T.

Whillier, A. and Richards, S.J.
HOT WATER FROM THE SUN
Print from Farmer's Weekly, Bloemfontein, South Africa.
696.4

1. This is a description of solar water heating apparatus, which can be constructed with relatively simple materials and unskilled labour. The authors are on the research staff of South Africa's Committee for Scientific and Industrial Research.

2. It has long been realised that the sun can be used to provide hot water for household use. Once installed, the solar water heating system operates continuously, practically without attention and with very little maintenance--heating water whenever the sun shines. A well-insulated water tank stores the heated water until required. There are many possible designs for a solar water heating system. The one shown here has the advantages of easy construction without special tools or equipment. The tank (which can be a standard type galvanised domestic hot water tank) would have to be purchased as a unit, with all necessary connections for pipes already in place.

3. Generally, water at 100-110°F is adequate for bathroom use, and 120°F is about the minimum for the kitchen. (Temperatures up to 130°F may be needed for greasy dishes.) The solar water heater can heat water up to 170°F.

4. A solar water-heating system consists of an insulated tank for hot-water storage, connected to a solar absorber which is mounted outdoors to have unobstructed exposure to the sun. Sunshine absorbed on the black-painted surfaces of the heater panel in the absorber heats the water within, and the water then flows by natural circulation into the tank for storage.

5. The heater panel consists of a network of tubes carrying water, which are soldered to a flat copper sheet. The side facing the sun is painted a flat black to improve absorption of solar radiation. Ordinary galvanised water tubing is used. (It is cheaper than copper tubing and no less efficient.) The only copper essential is the flat sheeting which must be soldered to each of the 1/2-in. tubes along as much of their length as is practicable to form the absorbing surface between the tubes. 28-guage (0.015 in. thick) copper is quite adequate for this. To facilitate soldering, the copper sheeting may be purchased in 9in. wide rolls and applied strip by strip across the tubes.

6. The tray for the absorber may be constructed of 24-guage galvanised iron or, alternatively, of wood. Where a 36.5in. tray width is selected, insulation, glass and hail screening may be 36in. wide without wastage. A length of 88in. is the maximum length that can be obtained from a 8ft by 4ft flat sheet of galvanised iron folded in the form illustrated. With a wooden tray, an absorber as large as 8ft. by 4ft. may be constructed since this is a standard size hardboard, and also glass, insulation and hail screening can be purchased in 4ft. widths. (Note that the heater panel for an absorber 4ft. wide would require eight tubes spaced 5.5in. apart.)

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7. The hail screen to protect the glass cover is not essential unless there is high hail danger locally. Wire-reinforced glass is unsatisfactory for such a screen since it does not satisfactorily transmit solar radiation. The glass covering may be formed by placing several sheets of glass edge-to-edge, but the joints must be sealed to prevent rainwater and dirt from getting into the collector. The joints can be filled with a good mastic sealing compound (secomastic). Joints should be inspected every few years and resealed when necessary. Felt or some other soft packing material must be used around the edges to avoid breakage of glass due to uneven pressure.

8. For insulation, slagwool, fibreglass or cork are best; but straw, sawdust or vermiculite can be used. All pipes which become even slightly warm must be insulated (wrapped with felt, e.g.) to a thickness of at least an inch. If the tank or pipes are exposed, the insulation should be protected from the rain; it should never get wet. Hessian or canvas coated with three layers of bitumen paint, protected by a further coating of bitumen-based aluminium paint will be adequate protection. It would be more satisfactory to enclose the tank in a suitable weather-proof box, with insulation between the tank and the box.

9. The bottom of the tank must be more than two feet above the level of the top of the absorber, if natural water circulation is to be satisfactory. For the same reason, all pipes must slope continuously upwards towards the tank. This will also avoid formation of air pockets in the pipe circuit. The total length of tubing between the absorber and the tank should be less than 25ft. for 1 in. tubing or 45ft. for 1 1/4 in. tubing.

10. The absorber should be mounted to face as near as possible to a true northerly position, and it should be titled towards the north at any angle between 15 and 45 degrees from the horizontal. The best tilt angle for year-around performance is about 10 degrees greater than the latitude of the locality in question.

11. On freezing nights the water should usually be drained out of the absorber (but not from the storage tank) so that suitable valves (gate valves, not globe valves) should be connected into the circuit, isolating the absorber from the tank and draining the absorber at its lower external connection.

12. Where electricity is available, the most satisfactory hot water system is a combined solar-electric system. With this arrangement, a conventional electric immersion heating element (2 kilowatt) is installed to heat the top quarter of the tank, so that whether there is sun or not there will always be hot water. By setting the thermostat of the heater to 135°F, electricity will be used only when solar heat is inadequate. The electric heater may be manually turned off when not required. Electricity would be used only in rainy weather or during periods of extra-heavy demand for hot water.

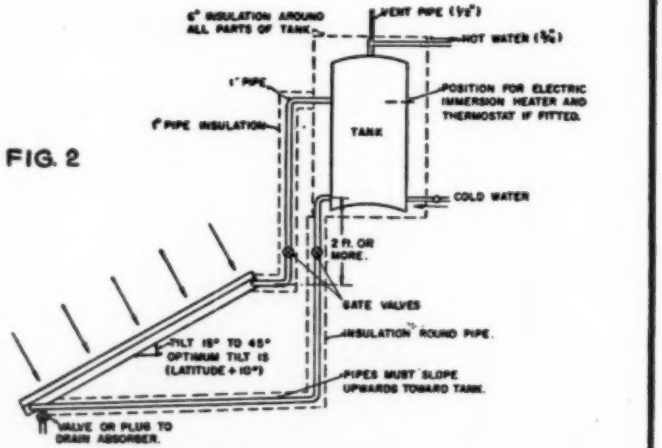
6" INSULATION AROUND ALL PARTS OF TANK
VENT PIPE (½")
HOT WATER (¾")
1" PIPE
POSITION FOR ELECTRIC IMMERSION HEATER AND THERMOSTAT IF FITTED.
4" PIPE INSULATION
TANK
COLD WATER
2 ft. OR MORE.
GATE VALVES
INSULATION ROUND PIPE.
TILT 15° TO 45° OPTIMUM TILT IS (LATITUDE + 10°)
PIPES MUST SLOPE UPWARDS TOWARD TANK.
VALVE OR PLUG TO DRAIN ABSORBER.

FIG. 2

SOLAR WATER HEATER CONNECTIONS.

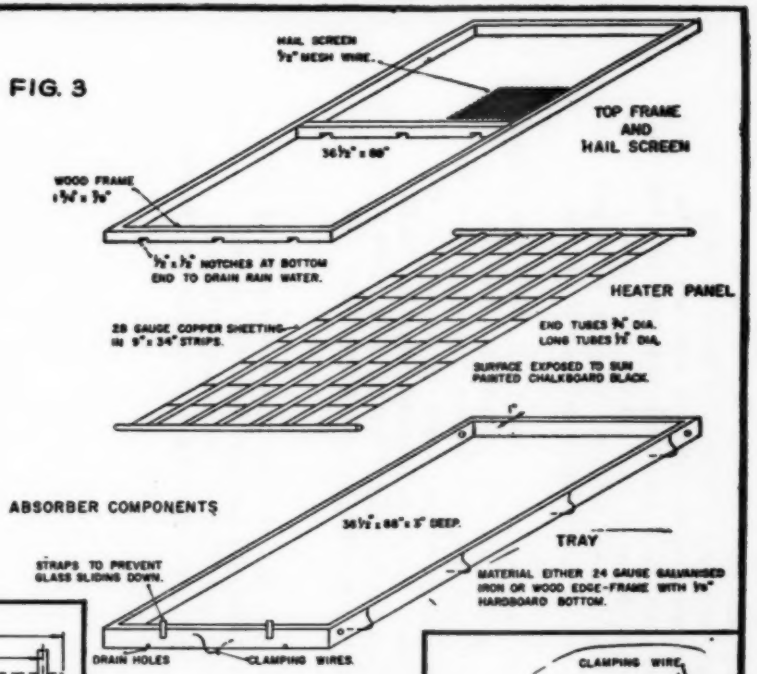
HAIL SCREEN ½" MESH WIRE.
TOP FRAME AND HAIL SCREEN
36½" x 88"
WOOD FRAME 1½" x ¾"
½" x ½" NOTCHES AT BOTTOM END TO DRAIN RAIN WATER.
HEATER PANEL
28 GAUGE COPPER SHEETING IN 9" x 34" STRIPS.
END TUBES ¾" DIA. LONG TUBES ½" DIA.
SURFACE EXPOSED TO SUN PAINTED CHALKBOARD BLACK.
ABSORBER COMPONENTS
36½" x 88" x 3" DEEP.
TRAY
STRAPS TO PREVENT GLASS SLIDING DOWN.
MATERIAL EITHER 24 GAUGE GALVANISED IRON OR WOOD EDGE-FRAME WITH ¼" HARDBOARD BOTTOM.
DRAIN HOLES
CLAMPING WIRES.

FIG. 3

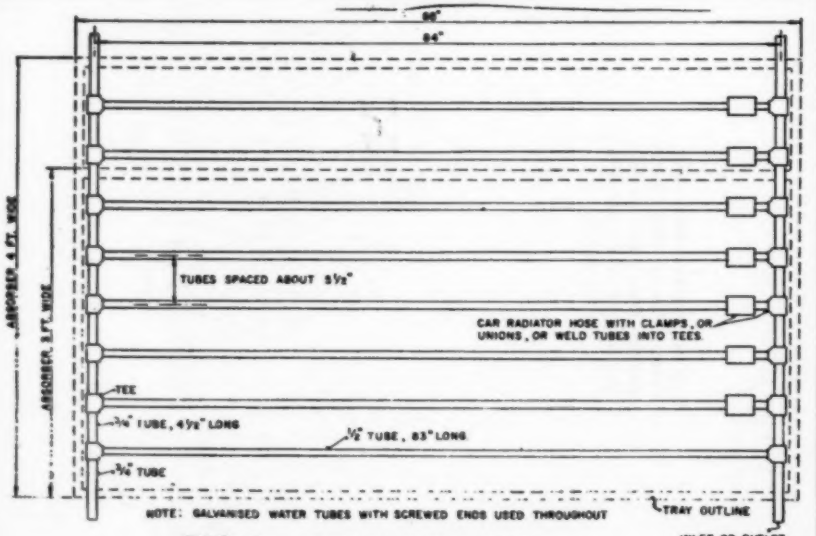

FIG. 4 TUBES FOR HEATER PANEL

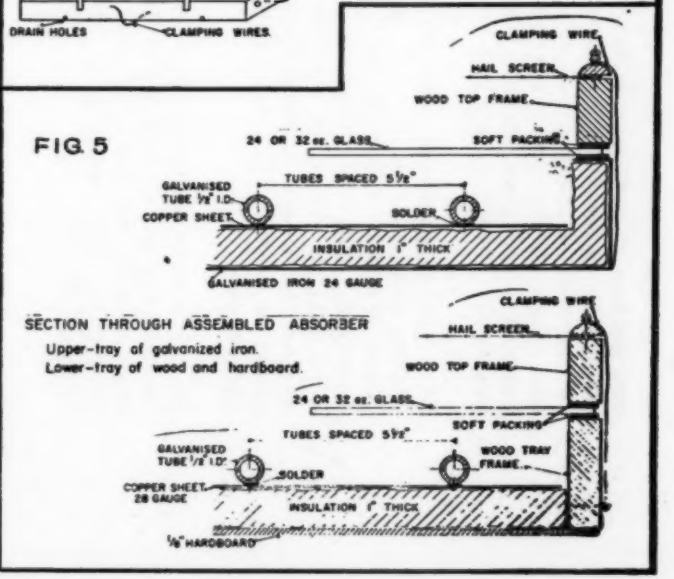

FIG. 5

SECTION THROUGH ASSEMBLED ABSORBER

Upper-tray of galvanized iron.
Lower-tray of wood and hardboard.

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13. On the average, each square foot of absorber area will heat one gallon of water each day to about 130°F. This will vary according to relative cloudiness or suniness of the day. The recommended minimum sizes of tank and absorber are real minima; and larger sizes are preferred because they yield more hot water and are less affected by cloudy weather (having a larger reserve). Sizes estimated are for all parts of South Africa.

14. The approximate cost of material for the tank, the connecting piping and the absorber are given for the larger centres in South Africa. Labor is not included, but about two days work is involved. The cost figures for materials come to about £50 for a 40 gallon, 40 sq.ft. system. It is estimated that in South Africa the annual savings in electricity for the same size unit would be between £15 and £18--clearly a sound investment for the householder.

15. The only maintenance necessary to keep the system in satisfactory operating condition involves hosing down the glass periodically to wash off dust, touching up on paintwork when necessary, and checking to see that the insulation has not become damaged or wet.

An experimental solar water heater. The absorber design (in the foreground) is not the same as those described in the article.

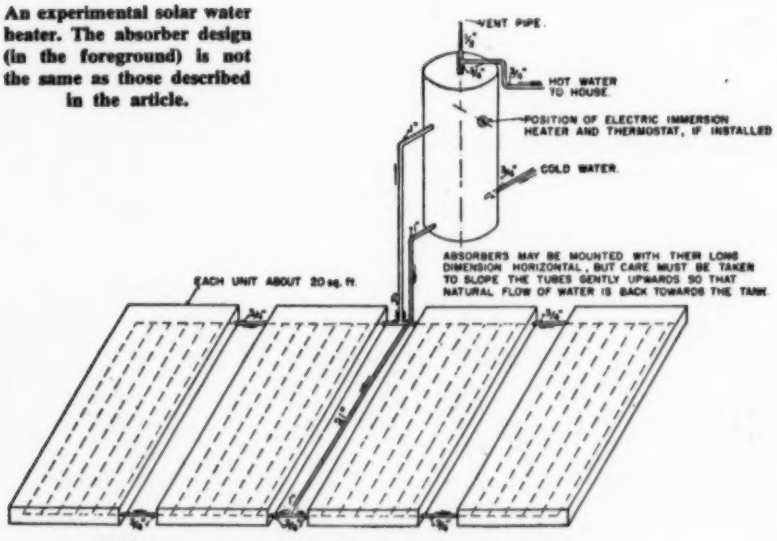

VENT PIPE.
HOT WATER TO HOUSE.
POSITION OF ELECTRIC IMMERSION HEATER AND THERMOSTAT, IF INSTALLED
COLD WATER.
ABSORBERS MAY BE MOUNTED WITH THEIR LONG DIMENSION HORIZONTAL, BUT CARE MUST BE TAKEN TO SLOPE THE TUBES GENTLY UPWARDS SO THAT NATURAL FLOW OF WATER IS BACK TOWARDS THE TANK.
EACH UNIT ABOUT 20 sq. ft.

FIG. 1 SOLAR ABSORBERS AND STORAGE TANK.

GENERAL

D.H.J.K.M.

Halpern, Joel Martin
TRADE PATTERNS IN NORTHERN LAOS
Community Development Review (International Cooperation Administration)
September 1958, pp. 42-47.
381 (59)

1. This is a general survey of one of the basic elements of human settlement in a setting of great interest. It describes different peoples in the same area and the trade relations and economic interdependencies which have grown up--as well as the impact of current events on the patterns and relations. Dr. Halpern is now Assistant Professor, Department of Anthropology and Sociology, University of California at Los Angeles; he was formerly a Field Service Officer with the ICA mission in Laos.

Geography

2. Northern Laos is defined in this paper as the area north of the administrative capital of Vientiane, consisting of six of the twelve provinces in the Kingdom. The author's experience, was mainly in Luang Prabang province, which is felt to be typical of the area around it.

3. Two of the most salient characteristics of northern Laos are the mountainous terrain and the very sparse, scattered settlements. Along the winding course of the Mekong River, the chief communication artery of Laos and the main river of Indochina, the settlements are clustered on the embankments. Away from the river, there are houses right on the mountain tops and on rugged slopes as well as in the valleys.

The Ethnographic Situation

4. The location of houses and human settlements in northern Laos are an excellent example of ethnic stratification based on varying geographical adaptations.

The Lao.

5. In the valleys along the Mekong and its tributaries, dwell the Lao, the dominant economic, political and social group. They are Buddhists, and their linguistic, religious and cultural affiliations are with the Lao of northern Thailand. In villages and in the few small towns, bamboo and thatch houses on stilts are the characteristic Lao homes. Paddy rice of the glutinous variety, the Lao food staple, is the principal crop, supplemented by small vegetable gardens, and the keeping of chickens and some pigs. For the majority, who live along the rivers, there is also fishing. The Lao produce enough to feed themselves easily, except in time of extreme drought. Most Lao are largely self-sufficient and are not motivated to produce surplusses for market, the exception being the case of fresh produce for Luang Prabang town (the royal capital of Laos and largest town in the north) and for some other towns to a lesser degree. Commerce in these areas is almost exclusively in the hands of Chinese and Vietnamese merchants, with some itinerant Cambodian cloth merchants also on the scene.

6. The Khamu. Inhabiting mountain slopes above the Lao are the Khamu. (The Lao call them Kha, or slave, although recently the term Lao Teng--"Lao of the Mountains"--has been considered more acceptable; in their own language, Khamu means "We, the people.") They are the aboriginal people

of Laos and are generally darker skinned and of shorter stature than the Lao. Their economy emphasizes slash-and-burn agriculture and the gathering of forest products. Many have tended to become Laotianized, and their way of life has lost much of its former distinctiveness. Still the Khamu language is quite separate, being a member of the Indonesian family. The Khamu show a low level of social integration into the nation.

7. The Meo. This third group lives on the tops of mountains. Their scattered settlements are small, consisting of two or three to a dozen plank houses built directly on the ground. The majority of Meo in Luang Prabang province are from neighboring Xieng Khouang. The Meo are relatively recent arrivals in Laos, having migrated from China within the last hundred years or so. Their religion is a type of shamanism, and their linguistic ties are with the tribes to the north in Yunnan and to the northwest in Thailand and Burma. Crops are raised exclusively by slash-and-burn, new fields being cleared on the faces of the mountains each year. The chief cash crop is opium. Both glutinous and non-glutinous rice, plus corn and some vegetables are grown. Meo livestock includes small horses used for transport over the steep mountain trails. The dress of the Meo is unique: men wear black trousers and a short open jacket, with a bright red sash around the waist; women, depending upon the sub-group to which they belong, wear either similar trousers, with a long colorful apron in front, or a short pleated skirt adorned with indigo-dyed batik designs. Almost all of the fabric used for their clothing is obtained through trade, and much of it is manufactured cloth. Both sexes wear large silver collars, the number worn by a person depending on the wealth of the family.

Trade: The Lam Institution

8. A most interesting feature of trade in northern Laos is the institution of Lam. (The term denotes the institution and the individual carring out the functions of Lam.) In this pattern, a person acts as intermediary between traders and the government on the one hand, and the tribal peoples on the other. The Lam himself is always a Lao, usually inhabiting a village having relatively good access to markets; he is often a village or district headman.

9. Traditionally, the Khamu have come to a Lam whenever they had some forest products to sell or wanted to buy salt or clothing. Then the Lam would arrange to trade with a merchant, unless he himself wished to engage in commerce with the tribal peoples. Lam is distinctly a reciprocal relationship: head taxes levied by the French were often paid by the Lam, and in return the Khamu worked in the fields of their Lam, when necessary, and they supplied him with game and forest products he might need. In the cases where the Lam was also their merchant, he enjoyed complete monopoly of trade. The relationship between a Lam and the Khamu was not formalized and depended largely on individual personalities. Thus a man might be

the Lam for a few tribal families or for entire villages. He might be the Lam to these people by inheriting the position from his father; or, if the Khamu found that he was dishonest in his dealings, they could seek another.

10. The institution of Lam has begum to disintegrate to a certain extent. Most Meo no longer use it, since many Meo men now speak a little Lao and are capable of handling their own affairs. Lam was never of primary importance among the Meo since much of their opiom trade was traditionally carried on directly with the Ho (Yunnanese) who traveled in horse caravans all through northern Laos.

11. Some Khamu are also beginning to speak Lao and to learn how to transport and market goods for themselves. They are legally regarded as equals to the lowland Lao under the present Lao constitution; and their sense of social inferiority is thus somewhat lessened. There has been a migration of significant numbers of Khamu from the mountainsides down to the valleys, where they have begun to adopt aspects of the Lao culture. Since even the valley areas are usually under populated, there has been little conflict with the Lao.

12. But the Lam institution has far from disappeared. French merchants still obtain benzoin and stic-lac through a Lam rather than from the Khamu gatherers themselves. (Benzoin is obtained from rather remote forest areas and must be painstakingly collected in small amounts over a long period of time.) The traditional pattern of Lam may exist nearly unchanged in the province of Phong Saly.

Means of Transportation

13. There are three means of transporting goods in northern Laos. The most important are by Lao dugout (pirogue), often with motor, and by antiquated river barge on the Mekong. Small commercial airplanes carry goods north from Vientiane and link the small towns in the north with the town of Luang Prabang. During the dry season, when the 400 kilometer road between the administrative and royal capitals is open, jeeps and trucks connect villages along the route. Thus, in previously isolated areas, there are now Lao settlements with landing fields, as well as villages along the river on the road, which function as trading centers for the mountain peoples. Some entire Lao villages have shifted their sites to the roadside in order to set up shops.

Village Trading and Marketing

14. In contrast to the towns, the usual pattern in these Lao trading villages is for business to be in the hands of a few Lao part-time merchants. This is a convenient arrangement, for it allows the tending of crops during the rainy season when trading is slack. Little capital is necessary to open a shop. (The store itself is often little more than the threshold of the owner's house, heaped with a few bolts of manufactured black cotton broadcloth to sell to the Meo, some locally-woven blue-black indigo homespun for trade with the Khamu, a row of flashlight batteries, a few bars of soap,

a basket of nails.) In addition to these village shops, there are other Lao merchants who obtain a small stock of goods in Luang Prabang and during the dry season go directly to the upland tribal villages.

15. Both the Meo and the Khamu supply the Lao middlemen with a variety of vegetables and forest products in return for manufactured or semi-finished goods. For example, in exchange for their opium the Meo obtain cloth, salt and iron bars, which their smiths forge into tools. (The Meo themselves consume a considerable amount of opium.)

16. Some small Meo settlements about 35 kilometers from Luang Prabang have begun to market certain fresh produce for which there is a ready market in town. Another important trade item for both Mao and the Khamu is charcoal, consumed in large quantities, since it provides the fuel for the power station of the royal capital. This type of trade has become sufficiently important to some Meo to have caused them to shift their settlements to mountain tops closer to town. As a result of both increased contact and increased cash, occasional Meo homes afford luxuries such as kerosene and even powdered coffee.

Currency and Trade

17. The Meo hold in great importance their silver currency, in the form of small ingots as well as the heavy neck collars and bracelets. Even today most Meo refuse to accept paper money, and old Burmese and Chinese coins are melted down in Luang Prabang and fashioned into bars specifically for trade with the Meo.

18. Opium is still of vital importance to Meo economy (and therefore the Lao government has not formally banned local trade in it). Yet now Meo purchases may just as likely have been paid for in potatoes or charcoal. Some Meo have been taking unusual initiative in the marketing of their produce: one group transported a ton of potatoes down the river to the capital, avoiding the middleman.

19. Trade relations between the Khamu and the Lao are closer and more direct than those between the Meo and the Lao. The Khamu are more accessible, and their traditional dependence on the Lao for transporting plus a lack of a high yield cash crop influence this. The chief trade items of the Khamu are forest products, wild game and rice (although they sometimes have to buy rice from the Lao when their own crops fail.) Woven bamboo sleeping mats, low bamboo stools and a variety of basketry used in all Lao homes are almost exclusively a Khamu craft. The Khamu make neat packets of banana leaves for wrapping food at market. In the Luang Prabang area betel nut and the special leaves to wrap it for chewing is a significant trade item. This commodity has actually promoted stability for some villages which, because of easy access to this commodity, are reluctant to follow the usual pattern of shifting village sites every few years.

Halpern, Joel, Martin. Trade patterns in northern Laos --5

20. The Khamu require the same basic trade goods as do the Meo: cloth, salt and iron. They do little weaving, yet most of their clothing is handwoven. This is because Lao women, proficient weavers, prepare lengths of indigo-dyed fabric for men's garments and skirt pieces in the dark striped tones preferred by Khamu women, and these goods are set aside in village shops to exchange when the Khamu descend to barter. Like most mountain people, the Khamu strongly distrust paper currency and, when not paid in kind, insist upon being paid in old silver coins, which cannot be easily destroyed, and whose value can be judged by illiterate people.

21. Often the Khamu lack sufficient goods to trade, and they are forced to work for the Lao as coolies or servants. Some are employed in almost every settlement or village and in larger towns. Such work is strictly seasonal, taking place in five distinct periods of the year. Such labor is usually paid a daily wage and supplies its own food, clothing and shelter. The work continues until a worker has enough saved to buy what he came to town for. Domestic servants, more permanent, are paid a token wage but receive free living accommoditions, food and clothing.

APPENDIX

EXAMPLES OF CURRENT WORK BY DOXIADIS ASSOCIATES

EDUCATIONAL STRUCTURES

in Pakistan and Syria

The Teacher-Student Center at the University of Dacca, East Pakistan

The Rural Teachers Training Center at Homs, Syria

D.F.G.N.T.

Doxiadis Associates
EDUCATIONAL STRUCTURES IN PAKISTAN AND SYRIA
727 (548) (56)

1. Doxiadis Associates has been commissioned to build number of educational buildings in the Middle East, two of which are described in this issue: a Teacher-Student Center at the University of Dacca, East Pakistan and a Rural Teachers' Training Center at Homs, Syria.

2. Among the other educational establishments built by Doxiadis Associates are: a Teological college for 450 students in Greece, a Polytechnic Institute for 600-1000 students in West Pakistan and Academies for training supervisors of village development in both East and West Pakistan.

3. As an illustration of the way in which Doxiadis Associates approaches the design of educational buildings in non-western cultures a resume follows of a statement made to the Government of Pakistan in September 1958.

4. East Pakistan, because of its climate and geography has, for thousands of years, suffered continuous and extensive destruction of its human settlements by water and flood. Thus, it has been impossible to develop settlements with permanent buildings which could create an architectural tradition. This is the reason why practically no local architecture of high standards has developed. The only existing architecture is that of the simple people, who know the climate as well as how to use the local building materials, but who are unable to develop further their forms of construction and achieve a lasting style of architecture.

5. The building in which the East Pakistani Government is now interested are educational; that is, buildings in which the future leaders are going to be educated. When we consider that the important formative years of the future leaders of Pakistan are going to be spent in these buildings, we realize the impact which they are going to exercise on the future architecture of East Pakistan. By necessity, the people who mature in them, will be influenced by their environment and will carry the ideas expressed there to the environment in which they are going to spend the rest of their lives. For some this may happen consciously for others unconsciously, but it will surely happen.

6. These considerations compel us to approach with feelings of great responsibility the task of designing such groups of buildings. To transplant ideas and solutions from other countries of different climate and geography would be wrong. Most of the buildings are influenced by foreign styles which have never been adjusted to the culture of East Pakistan. A continuation of this practice should be considered economically, practically, culturally and aesthetically wrong.

Doxiadis Associates. Educational structures in Pakistan and Syria. -2

7. What then is the right solution? It seems to us that this lies in an effort to develop new ideas by utilising the structural materials of the country. The future architecture of East Pakistan can only be derived by developing the healthy tradition that exists in the country itself. It can only grow out from the simple huts which are built with very cheap materials by the people themselves. Even the highest expression of architecture is only justified when it is an evolution of forms and techniques that already exist in the country.

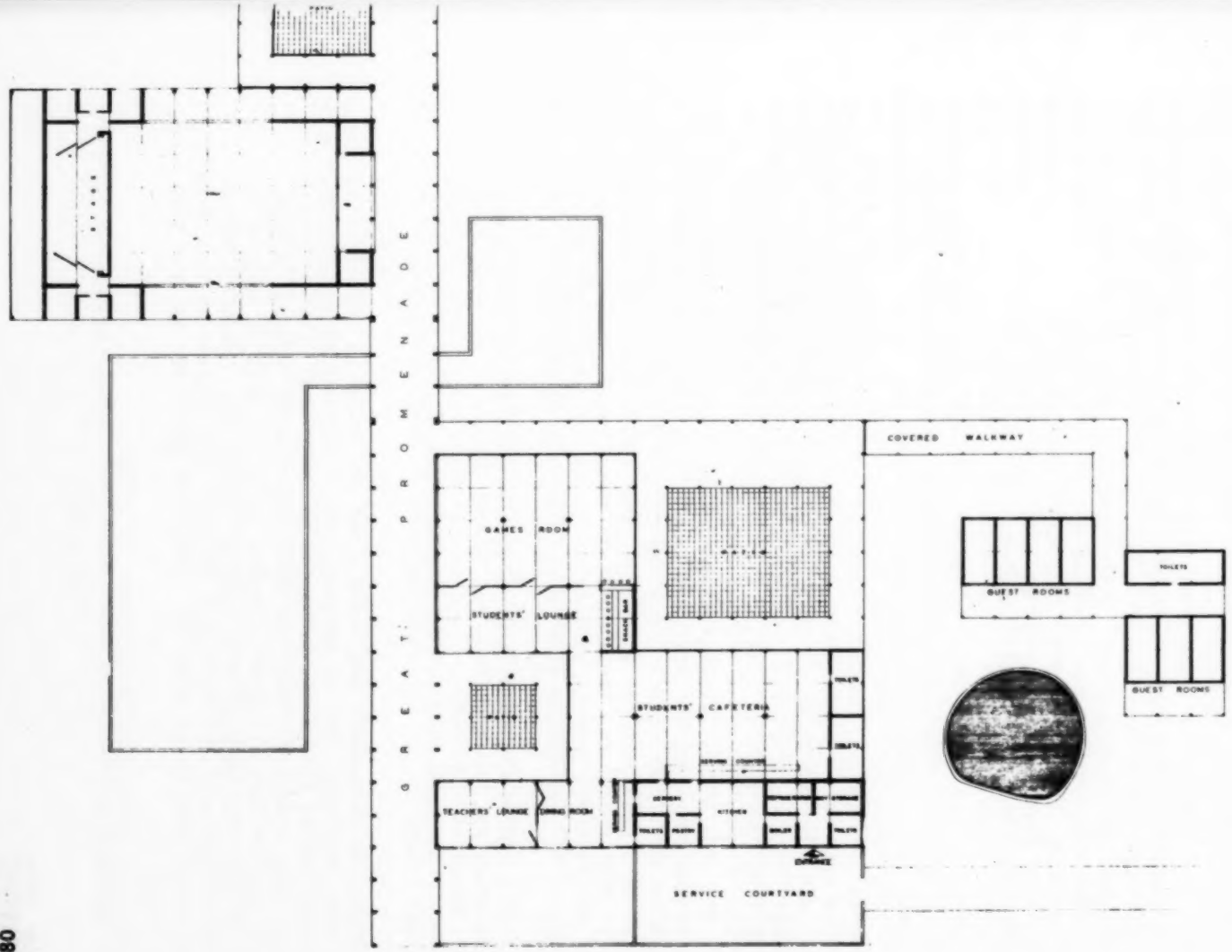
8. It is only if we proceed with modesty and determination to help the evolution of existing forces that we can hope to create something new. If we try to import it, then we treat the landscape and people in a dictatorial way which most certainly is not wise.

9. What then is our role in designing these buildings? It is the role of the agent who uses his experience to channel the existing potential into better forms of expression; it is the role of the servant who looks after local interests and developes them until they become strong enough to develop by themselves; it is the role of the gardener who looks after seedlings so that they may grow into tall trees which can withstand storms.

10. The Teacher-Student Center at the University of Dacca, East Pakistan is intended to provide facilities for a rich program of social, recreational and educational activities for both students and teachers. This building complex includes an auditorium (which can also be used as a theatre and banqueting room); a 3 storey structure containing one large and three small meeting rooms, library, bookstore, work room (for making posters, etc), and administrative offices, dining room, snack bar, lounges, games room and students council offices; also, in a separate wing, two sets of guest rooms.

11. The basic conception of the architectural forms have been derived from the traditional Bengal architecture which has developed from the particular climatic conditions prevailing in East Bengal. This has been adapted to modern construction methods, using thin slabs and shells which require light foundations, as the soil does not readily support heavy foundations. Also, the buildings have been protected from heavy rainfalls and direct sunlight, but breezes are allowed to penetrate freely.

12. In preparing the designs due consideration is paid to incorporating a Cenotaph, Hindu tombs, and all important trees in the landscape. The height of each building was determined on the basis of the heights of the existing trees, so that, whereas the highest building will dominate over the trees, all other buildings will be sheltered under their foliage. A system of covered walkways has been adopted connecting all building.



GROUND FLOOR PLAN

SCALE

PAKISTAN

TEACHER STUDENT CENTER

AUDITORIUM
CAFETERIA
LOUNGES
GAMES ROOMS
GUEST ROOMS

SHEET 3 OF 4

SCALE 1/8" = 1'-0"

D - PTA 3

REVISIONS

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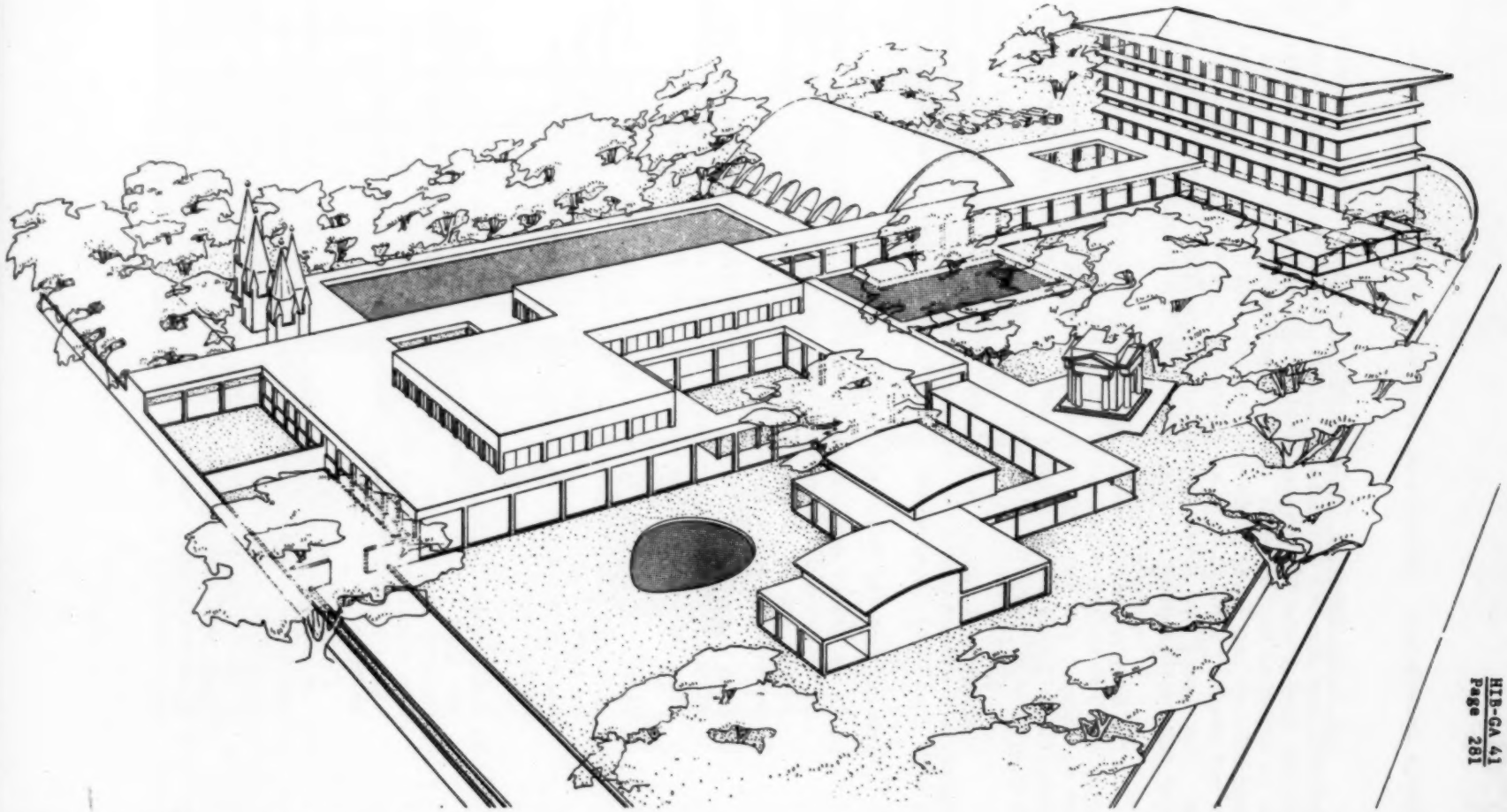

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Page 281

TEACHER - STUDENT CENTER IN DACCA • PERSPECTIVE VIEW

Doxiadis Associates. Educational structure in Pakistan and Syria. --3

13. The Rural Teachers Training Center at Homs, Syria, contains sleeping accommodations for 320 students in 10 two-storey units, each floor (16 students) having its own common sitting room and a large verandah. Each unit is oriented to the south west, thus catching the beneficient westerly summer breezes and being protected from the cold winter north-easters. This orientation is also very advantageous from the insolation point of view. The summer sun never penetrates deeper than the verandah, the winter sun reaches deep into the common room from midday to sunset.

14. The largest new building in the complex contains the cafeteria, library and recreation rooms under the same umbrella roof. In addition there are houses for the instructors, service building, dispensary and workshops. A little further away there is a group of farm buildings including poultry houses, dairy and machinery barn.

15. A spread out layout was adopted with a generous allottment of enclosed, semi-enclosed and open spaces. The buildings themselves have been kept small and independent, connected with covered walkways.

16. The reasons for this layout were:

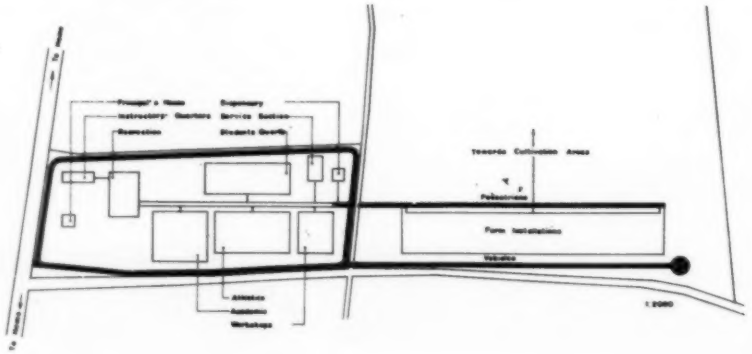
a. It is better adapted to the climate, permitting all the rooms to be properly orientated and ventilated. Glare from the summer sun is eliminated by the interposition of verandahs, patios and vegetation.

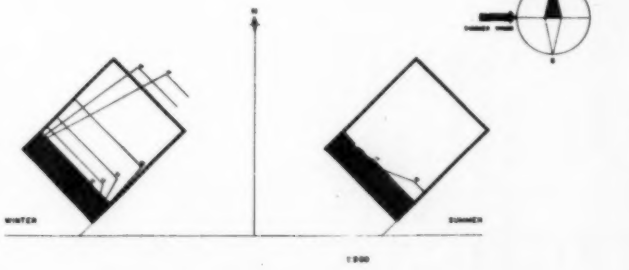
b. This conception fits in with the character of a rural institution and the landscape of the surrounding agricultural area far better than heavy and compact buildings.

c. Students coming from rural areas will find themselves in a pleasant and not unfamiliar environment and will get used to an amended way of living not impossible to introduce into those rural areas in which they will spend their future activities.

d. Independent buildings can better serve the purposes they are designed for, as there are no restrictions and compromises imposed by the need to house many different functions under the same roof. They can therefore assume the best shape, size and height for the functions they are intended to serve.

17. All the buildings have been designed on a 3 m. grid. Foundations are of reinforced concrete and stone. All bearing and covered parts of the buildings are of reinforced concrete, the walls and partitions mainly of hollow cement blocks and occasionally of brick or stone (director's house). Floors, according to their use, are of terrazzo, cement tiles or precast concrete slabs. Central heating is provided by three separate networks, each supplying a group of buildings. This system is considered



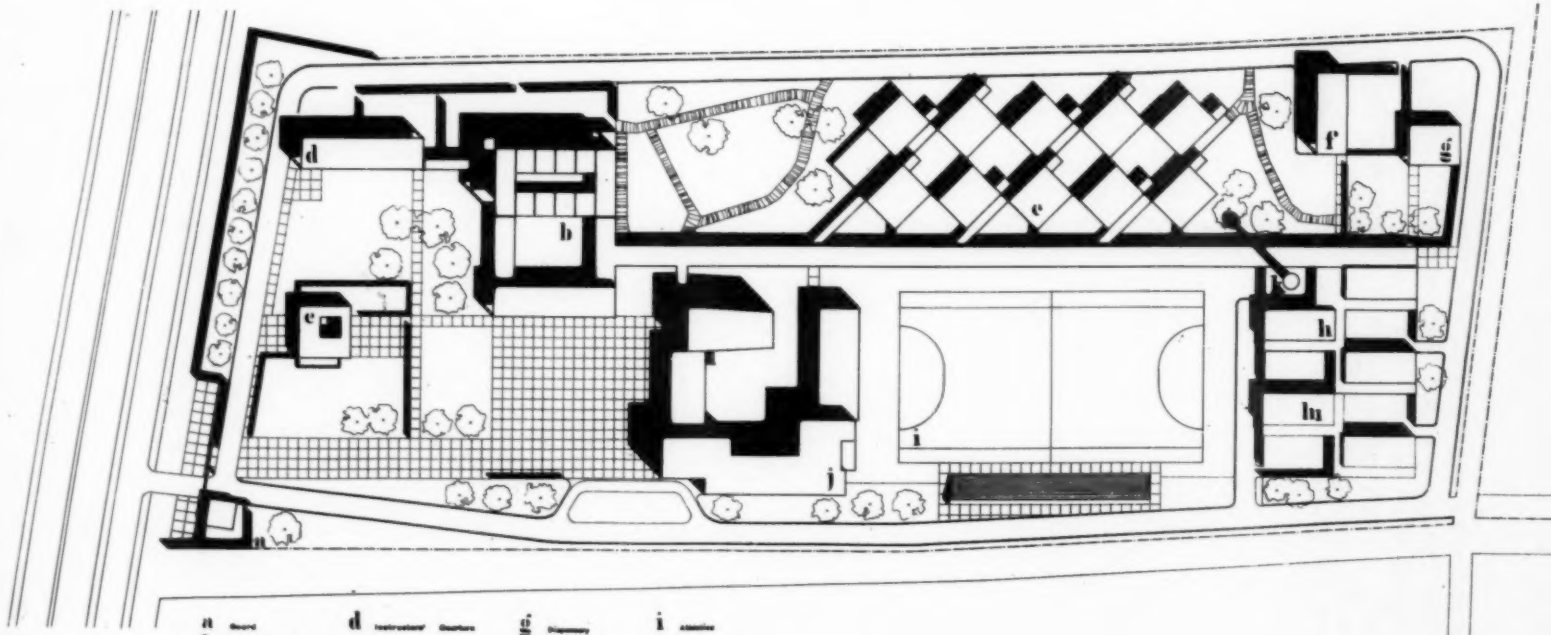


GOVERNMENT OF THE UNITED ARAB REPUBLIC

RURAL TEACHERS TRAINING CENTER AT HOWS

PLOT PLAN CIRCULATION & INSOLATION DIAGRAMS

SCALE 1:500



a Guard
b Cafeteria – Prayer
c Principal's House
d Instructors' Quarters
e Students' Quarters
f Service Section
g Dispensary
h Workshops
i Athletics
j Academic Bldg
k Water – Tower

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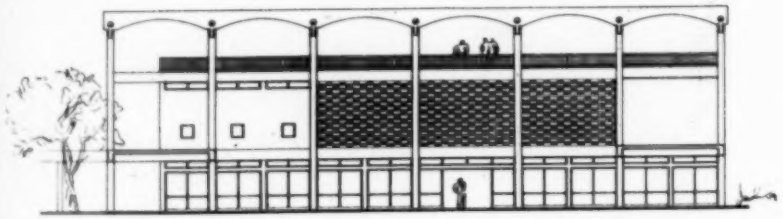
GOVERNMENT OF THE UNITED ARAB REPUBLIC

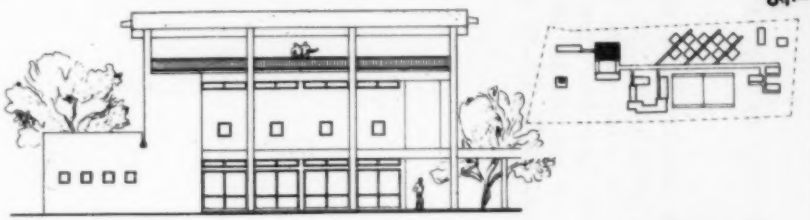
RURAL TEACHERS TRAINING CENTER AT ISNAIS

PERSPECTIVE VIEW OF THE WESTERN COURT

to be the most economical in this instance, both in construction costs (by avoiding long trenches for pipe connection and branching) and operation costs (by combining homogeneous buildings in each group in which heating will be needed at more or less the same hours). The costs of the buildings are estimated to cost US $7.00 per cubic meter excluding all passage ways, etc., which are estimated at US $3.50 per cubic meter.

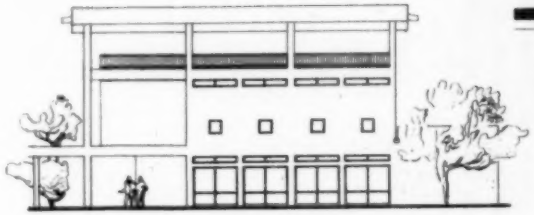


SOUTH ELEVATION



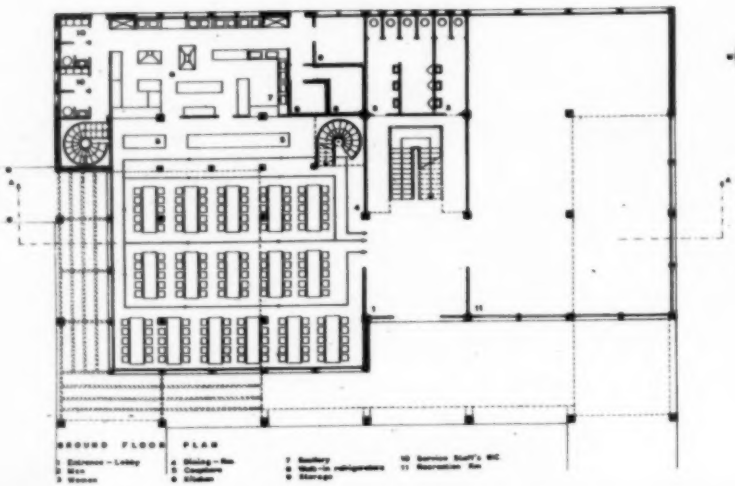
WEST ELEVATION

SECTION A—A



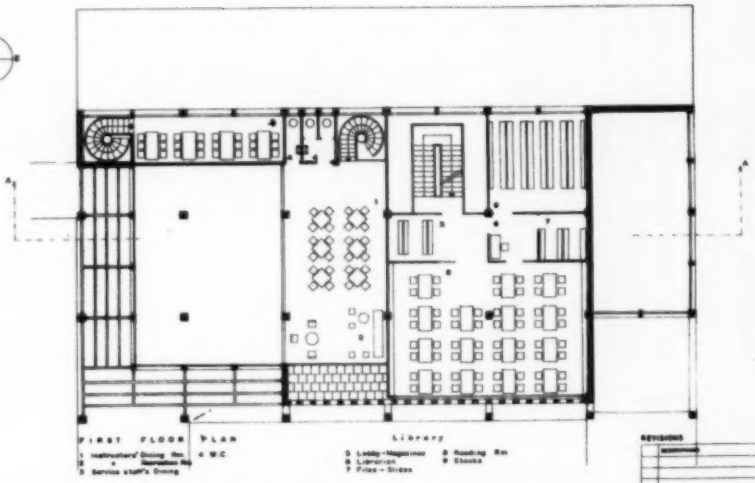
EAST ELEVATION

ROOF PLAN



GROUND FLOOR PLAN

1 Entrance – Lobby
2 Men
3 Women
4 Dining – Re
5 Cloakroom
6 Kitchen
7 Pantry
8 Work-in refrigerators
9 Storage
10 Service Staff's WC
11 Recreation Rm



FIRST FLOOR PLAN

1 Instructors' Dining Rm
2 Service staff's Dining

WC

Library

5 Lobby – Magazines
6 Librarian
7 Files – Slides
8 Reading Rm
9 Stacks

REVISIONS

GOVERNMENT OF THE UNITED ARAB REPUBLIC

RURAL TEACHERS TRAINING CENTER AT MINIA

b

CAFETERIA RECREATION & LIBRARY BUILDING

SHEET 3 OF 6

SCALE 1:100

D-STA 3

DESIGNED
TRACED
CHECKED
APPROVED
OBJECT NUMBER

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GOVERNMENT OF THE UNITED ARAB REPUBLIC

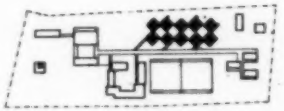
RURAL TEACHERS TRAINING CENTER AT HOMS

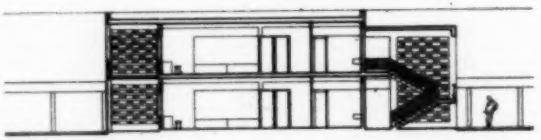
e

STUDENTS QUARTERS

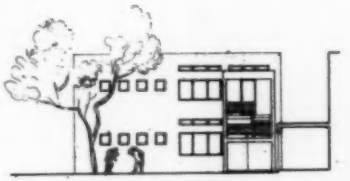
SOUTH - EAST ELEVATION

SOUTH - WEST ELEVATION

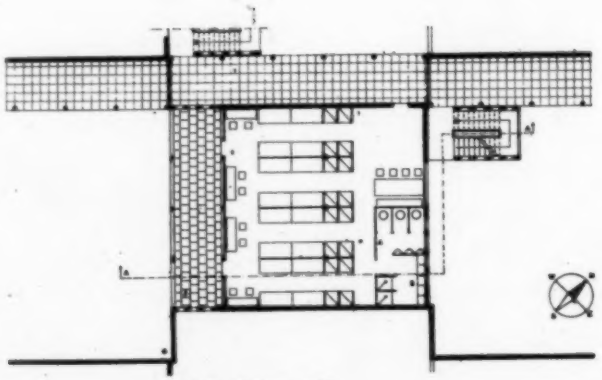




SECTION A-A



NORTH - EAST ELEVATION



TYPICAL FLOOR PLAN

NORTH - WEST ELEVATION

List of Recent Publications of Interest

Dube, S.C.
India's changing villages. Ithica, N.Y., Cornell University Press, 1958.
230 pages. Photos.

Great Britain, Meteorological Office
Tables of temperature, relative humidity and precipitation for the world.
London, 1958. (6 volumes).

*Portugal. Commission pour la Co-opération Technique en Afrique au sud du Sahara.
Conférence régionale pour la recherche sur le logement an Afrique au sud du Sahara. Pretoria, published by Portugal, Ministère des Provinces d'Outre-Mer, Novembre, 1952.
(Part I: Organisation des communautés; Part II, Disposition des logements; Part III, Considérations d'hygiéne dans les logements.)

U.S. Federal Housing Administration
Minimum property standards for one and two living units. Washington, Government Printing Office, November, 1958.
315 pages. Illustrations, tables. ($1.75)

*University of Natal
Small towns of Natal: a socio-economic sample survey. Pietermaritzburg, University of Natal, 1953.
113 pages. Photos, tables, charts
(Natal Regional Survey Additional Report No. 3) (17s. 6d)

*University of Natal, Dept. of Economics.
Experiment at Edendale: a study of a non-European settlement with special reference to food expenditure and nutrition. Pietermaritzburg, University of Natal, 1951.
246 pages. Photos, tables, charts.
(Natal Regional Survey, Report No. 1)

Wertheim, W.F. et al.
The Indonesian town: studies in urban sociology
Volume four in selected studies on Indonesian by Dutch Scholars, the Hague and Bandung: W. van Hoeve, Ltd., 1958.
379 pages. Illustrations.

*These have only recently come to our attention.